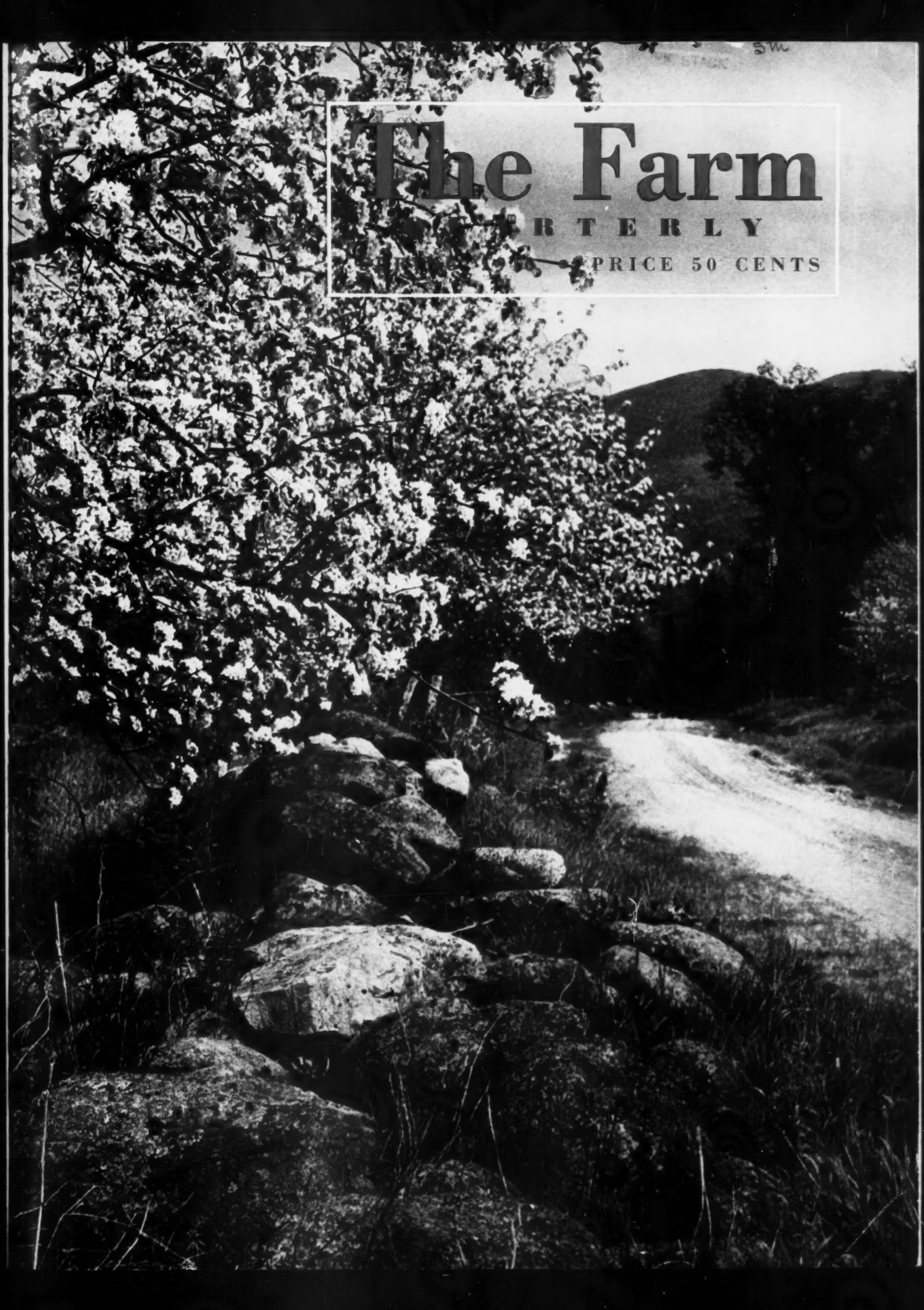
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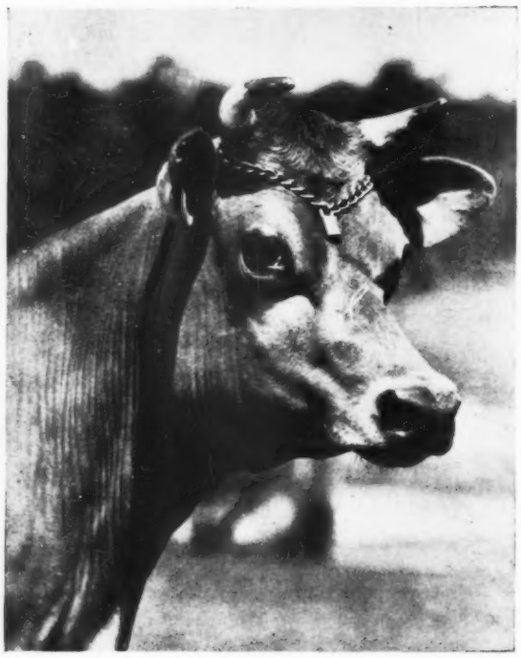

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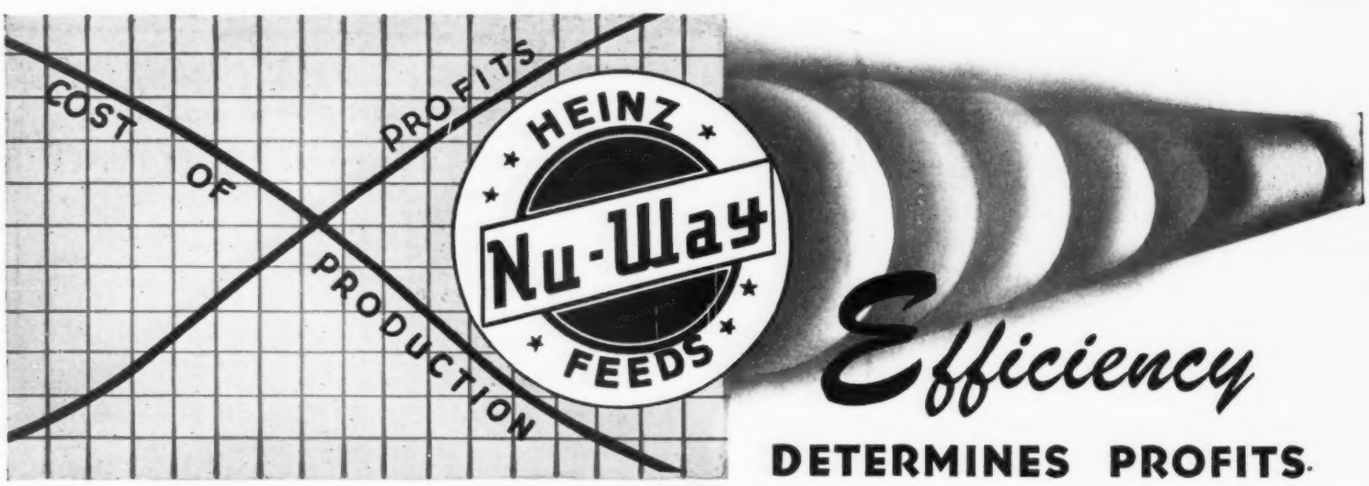

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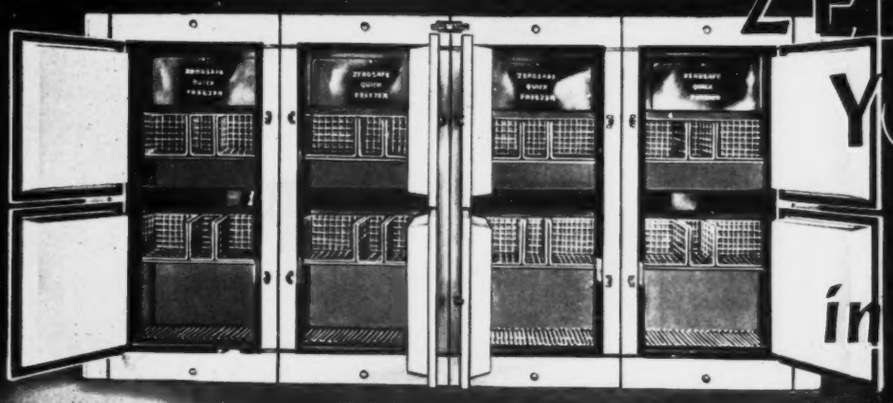

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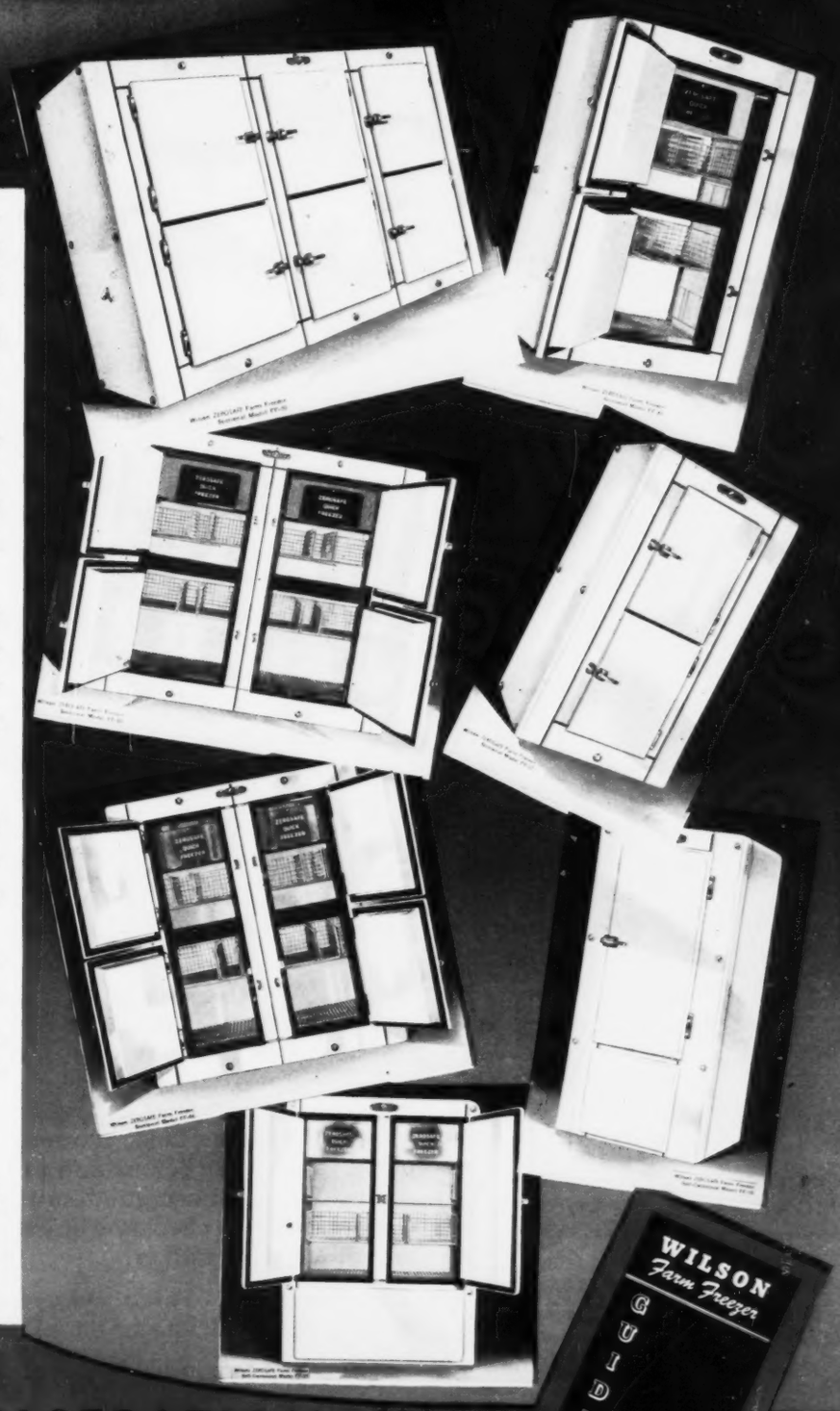

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THE FARM QUARTERLY

22 EAST 12TH STREET **CINCINNATI 10, OHIO**

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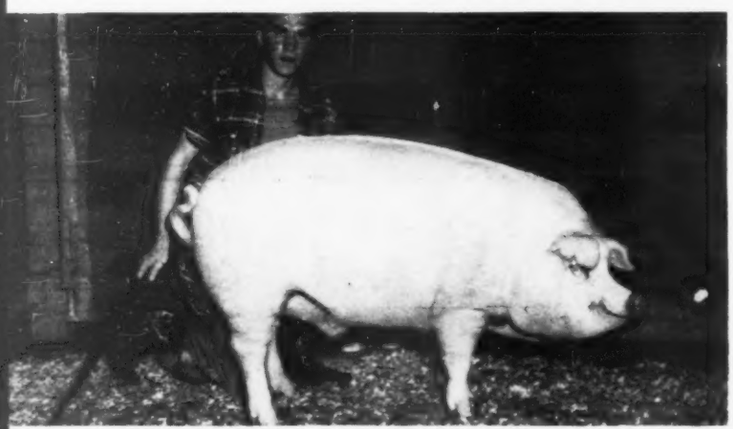

GRAND CHAMPION BARROW BRINGS $296 In addition to this 370 lb. Wayne-fed Grand Champion of the Ak-Sar-Ben Show, Omaha, Donald Popken of West Point, Nebraska, also won the Reserve Championship with his beautiful 850 lb. Hereford Heifer. At the Chicago Fat Stock Show, Donald captured 1st in the heavy-weight barrow Junior competition with a littermate of the hog shown above. It's WAYNE all the way for Donald—with winning results time after time.

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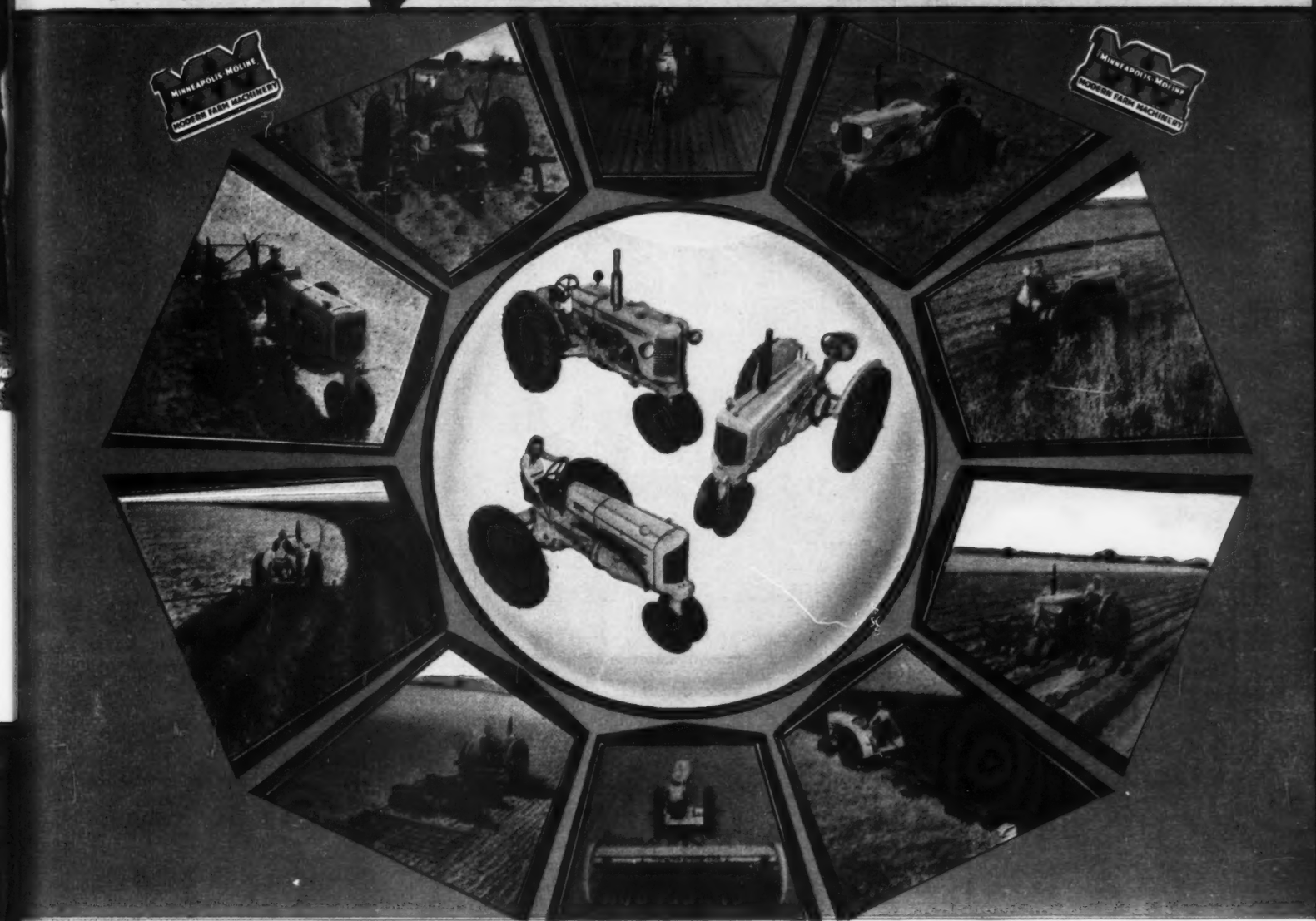

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Discing (10-ft. tandem)	907	142	505	6.38	.55
Dragging (5-sec. peg tooth)	582	45	104	13.0	.18
Planting (4-row checkrow)	140	28	65	5.0	.46
Drilling and discing in one operation (8-ft. tandem disc, 8-ft. drill)	171	35	131	4.9	.76
Cultivating (4-row cultivator)	899	143	304	6.3	.34
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*Average fuel consumption per acre for all operations above—.56 of one gallon.

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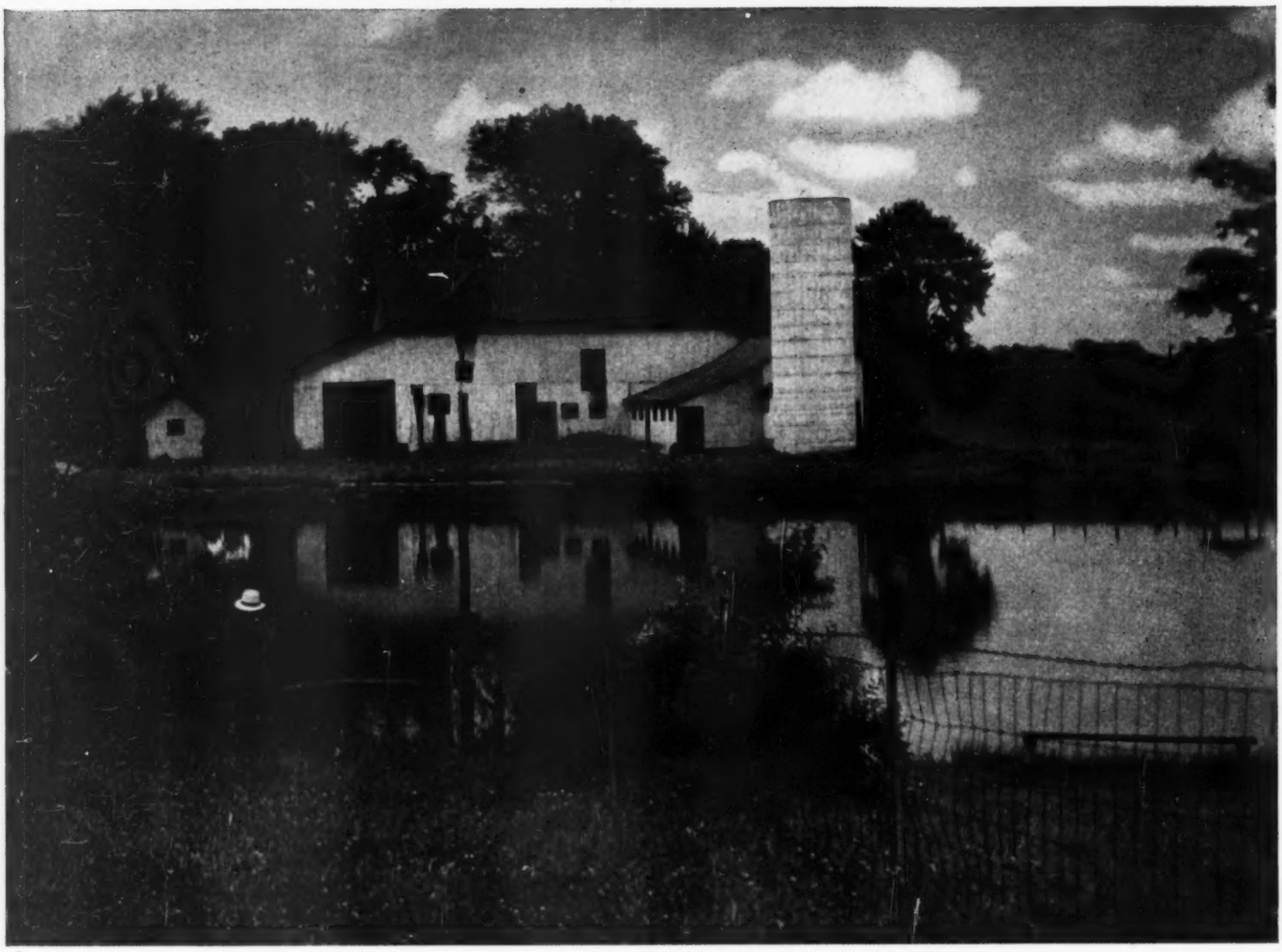


WATER FOR THIRSTY FARMS

VIRGIL OVERHOLT, A VETERAN OF TWENTY-FIVE YEARS OF POND BUILDING, PLANS A SMALL FARM POND AT MINIMUM COST

WHEN I was a boy on an Ohio farm we had an old horse named Babe who had the soul of a bum and the cunning of a perverse woman. She was a fine one for discovering ways of getting out of work, of stalling for time, and ambling softly away. It was my chore to go to the pasture before the mist started to rise and shoo in the horses and the cows which I shut in their stalls and fed before getting my own breakfast

I always knew where to find Babe. Standing belly-deep in the pond at the far end of the pasture, she switched imaginary flies and peeled her one good eye at me, wondering what I had picked up in the way of clods to bounce off her weather-beaten flanks. It was a job, sometimes, to get Babe out of that pond and headed for the barn. I came to hate that pond and vowed if I ever had time I would drain it and outsmart Babe.

But the time never came. Babe died and the pond remained to become a blessing in disguise, for wells dried up during the summer months, springs ceased to flow, and there was a great cry in the land for water—water to assuage the thirst of animal and man, water for greedy corn and wheat and hay, water to hold the soil in place. Our neighbors sold some of their stock, or hauled water long distances, while our pond, filled to the brim during the spring rains, continued through the hot summers to provide water for our animals.

This problem of getting enough water on the farm keeps our agricultural engineers awake at nights and many farmers in the middle west are eyeing with longing the life of a city man who has never yet failed to get water when he turns on the faucet in his bathtub.

Enough water on the farm, especially in the middle west, may be had with certainty by the farmer with a pond. Why then don't all farmers make one—especially when state governments make inducements ranging from loaning earth moving machinery to a reduction of taxes to aid in farm pond building?

Why doesn't the farmer build his pond? —you've guessed the answer. The successful farmer does. He builds farm ponds by the tens of thousands just as the successful business man builds up a cash reserve for depression years. In Missouri 11,322 farm ponds were built in 1943; in Kansas, 10,000; in Kentucky, 18,000.

With water the mainstay of live stock,

you'd think the first thing an experienced farmer would do is to maintain an everlasting water supply with a farm pond, particulraly since his state and federal governments use general purpose tax money to make farm pond building easier and cheaper. Farm ponds are more often built by business trained men who would no sooner run a farm without a permanent source of water than they would run a business without multiple sources of raw material. When the city man builds his farm pond, he seeks expert advice, realizing he knows nothing about the subject. When the dirt farmer builds a pond, he tackles the job alone and when it washes out he refers spectators to the local "cloud burst conditions" which "washed out every farm pond ever built around here." That's just what the cloud burst did—but it didn't wash out the ponds built by men with the know-how.

Why Ponds Fail

The record books of Ohio's Department of Agriculture show nine out of ten farmer designed and farmer built ponds failing within a year of their construction. Most failures occur during the months of June and July due to one cause—lack of an adequate spillway. This is the season of local storms of short duration but of extremely high intensity, causing local havoc but which do not have the slightest effect upon the Ohio or Mississippi Rivers. Farmers invariably say, as water races over their dam and the wall crumbles, "but this was an unusual rain." The pond should be designed to take the greatest intensity of rainfall to be expected once in twenty-five or fifty years, for that "unusual rain" may come tomorrow.

Most farmers build ponds in watersheds that are too large and some think they cannot construct a pond without building a dam across a stream. The larger the watershed the more flood water there is to handle through the spillway. A watershed of five to ten acres is ample for a quarter acre pond under mid-west conditions. A watershed of ten to twenty acres is adequate for a pond of one-half to two acres, or even larger under some conditions. The vegetative cover on a watershed has an important bearing upon its proper size. Roughly, there will be about twice as much run-off per acre from cultivated land as from pasture land. Likewise there will be twice as much run-off from pasture as from woodland; and more run-off from hilly than from flat land.

There is another reason for keeping the size of the watershed within reasonable limits. The annual soil loss per acre due to erosion may be as much as fifty tons on cultivated land. It will range from a trace to five or ten tons per acre from pasture or woodland. Most of this soil will be deposited in the bottom of the pond. Many ponds at the bottom of a large, hilly, row cropped watershed have become completely filled with silt within five years.

It is obvious that cultivated crops such

THIS POND is in a permanent pasture near the barns on a dairy farm. Run-off is from twenty acres, all in blue grass sod. There are no more water supply headaches here.

WOODS AND PERMANENT PASTURE form an ideal watershed for this pond. Stock are fenced out and drink from water that is piped to a tank just below the dam.

SPRINGS AND PASTURE run-off supply this pond. Silting is at a minimum. It supplies water for house and barns. The pond is stocked with blue gills and catfish for table use.

SPRING FRESHETS filched the soil from the fields and carried it away down this gulley.

THE SAME WATERS are now tamed by a dam across the gulley at its narrowest part.

EVEN DURING HEAVY RAINS this type of spillway will handle the overflow without danger to the dam. The concrete wall seals the dam, preventing seepage.

as corn are not desirable in a watershed supplying a pond .Certainly not more than one-fourth of the watershed should be in such crop in any one season. It is desirable that the farmer own the entire watershed in order to be able to control the cover grown upon it.

If the pond is not to be a mud hole during dry periods, it is necessary to have adequate depth. The loss of water due to evaporation in Indiana and neighboring states will average about twenty-five inches during the growing season and there will always be some loss due to seepage. In order to have adequate water during drought periods, the pond should have a depth of at least six feet at the deepest point. Seven or eight feet would be better and will prevent the growth of algae and the accompanying stagnant condition. Farmers frequently ask me how to keep such plants as cattails from covering the entire bottom. The answer is simple. Cat-

tails will not grow in water over four feet deep. Proper depth will insure clean water if other precautions are observed.

Livestock should never have direct access to ponds. Cattle and hogs will make a mud hole out of the best pond ever built. I recently spent an hour and a half helping remove a valuable cow from a pond in Warren County, Ohio. The herd had tramped the shallow end into a deep muddy condition and this particular cow became hopelessly sunk. A fence around the pond will prevent such accidents. To supply livestock with water, run a pipe through the dam to a stock tank below. The water in the tank can be controlled by a float valve.

How To Choose The Site

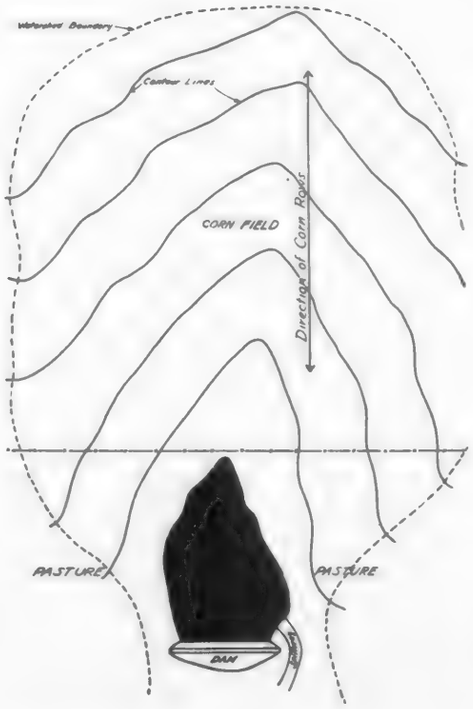
The ideal location for a pond of one-fourth to three acres will be a gently rolling pasture of wooded watershed of from five to twenty-five acres. A wooded watershed may be larger than one in pasture. This assumes a well managed pasture and a woods thick enough to be covered with litter. Over-grazed pasture may be about as bad as cultivated land.

Select a site for the dam where the valley sides come together, and widen out above the dam. This will enable you to secure a relatively large pond with a short dam. The valley floor above the dam should be as nearly level as possible. Flat valley floors make it possible to back water up a long distance with a rather low dam. For example, if the ground surface above the dam rises at the rate of two feet per hundred feet and the pond is six feet deep at the dam, the water will back up for three hundred feet. On the other hand, if the ground surface rises at the rate of six feet per hundred, a six foot depth at the dam will back the water up only one hundred feet.

The soil on the bottom and sides of the pond should be a clay or a clay loam. It is seldom practical to construct a successful pond over a well drained sandy or gravelly soil. Do not be discouraged if you cannot locate a pond site that meets all these requirements perfectly. A successful pond can be constructed on almost any farm having a clay or clay loam subsoil. Even if ponds are built on soils where seepage loss is a little high, they will tend in time to seal themselves. Seepage loss can be reduced by treating the bottom and sides of pond with a volcanic clay called Bentonite. Bentonite costs little and is carried in stock in large cities.

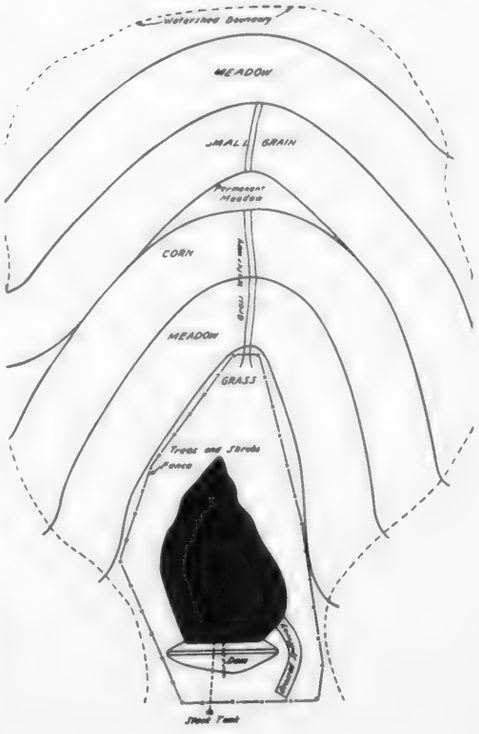
FARM ANIMALS like to dunk themselves in the waters of a pond on hot summer days. Fence them out, for they pollute the water and can mire down in the mudholes they make.

THE WRONG WAY. ABOVE DRAWING SHOWS COMMON ERRORS MADE IN BUILDING A POND



THE WRONG WAY: a simplified drawing of the above picture showing how pond silts up from soil washed down corn rows, planted across contour lines. Livestock have access to pond. As much as 50 tons of soil per year will wash into pond from each acre. The pond is built to fail.

THE RIGHT WAY: a simplified drawing of the picture on the opposite page shows how crops follow contour lines; pond is fenced; water supplied by tank fed from pond. Little erosion on slopes and little silting will result from this plan of pond, fields and crops. The pond will not fail.



THE RIGHT WAY
CONTOUR PLOWING AND STRIP CROPPING PREVENT EROSION AND SILTING UP OF POND. CATTLE DRINK FROM TANK FED BY PIPE FROM POND
J.C. SNOOK

Permanent Works of Men

In his school history of the United States, Barnes says, "It is a singular fact that sod covered mounds of earth are the most permanent works of man." But to be permanent, earth dams must be carefully designed and properly constructed. Most earth fills are too narrow at the base, have side slopes that are too steep, and do not extend high enough above normal water level. Under no conditions should it ever be possible for flood water to overtop the dam. Overtopping is the most common cause of failure.

It is seldom safe to have side slopes on the pond side of the dam steeper than one foot of rise to three feet of horizontal distance. On the down stream side the slope of the dam may be as steep as one foot of rise to two feet of horizontal distance. Make the top of the dam not less than six feet wide. Make it at least twelve feet wide if you wish to use it for a driveway. Build the dam three feet or more above the spillway level.

These conditions determine the width of the dam at its base. For example: suppose the dam is to provide for a seven-foot depth of water. The total height of the dam will be ten feet. A three-to-one side slope on the pond will require thirty feet of width. A two to one side slope will require twenty feet of width on the lower side. Assume a minimum top width of six feet. The total width of the dam at the base will then be thirty feet plus twenty feet plus six feet top width. This is fifty-six feet. In other words the dam will have to be at least five and one-half times as wide at the base as it is high. And remember that these are minimum requirements for a safe dam. Unless the earth is packed extremely well during construction, allow from five to ten percent of height for settling.

The soil at the dam site is frequently covered with a heavy growth of grass, brush or weeds. This material must be removed before the fill is started. The top soil may contain a mass of roots and decaying organic matter. It is important to remove this material to prevent seepage. Apply this fertile top soil to the finished down stream slope as an aid in securing a good stand of grass.

The surface of the dam site may consist of from one to several feet of porous soil. Where this condition exists it will be necessary to excavate a trench under the center of the dam, at least five feet wide, extending down to impervious soil. Fill the trench with packed clay.

In making the fill, secure the material as nearby as suitable soil can be found. Place the most impervious material in the center of the fill and the least desirable material at the down stream edge. Place in thin layers and pack well. It is seldom possible to do as good a job of packing as is done in public works dams, but a fair job can be done by the proper use of tractors in delivering the materials. Do not pile rocks in the fill. Save them to riprap the shore line.

An Adequate Spillway Essential

A safe method of getting flood water through the pond is essential. Many dams are washed out by intense storms lasting less than one hour. If you have a pasture watershed of less than twenty-five acres a grassed spillway will be most satisfactory. Build this spillway in undisturbed soil around one end of the dam. The grassed spillway should be wide to spread the water into a thin sheet, thus slowing down its velocity. It should have a gentle and as nearly uniform slope as possible.

Let us consider the spillway for a pond in a fifteen acre pasture watershed of rolling topography. Suppose it is necessary to give the spillway a drop of eight feet in one hundred feet. These conditions would require a grassed spillway twenty-one feet wide, or about two and one-half feet wide per acre of watershed. The steeper the waterway the wider it must be to hold the velocity of the water within safe limits.

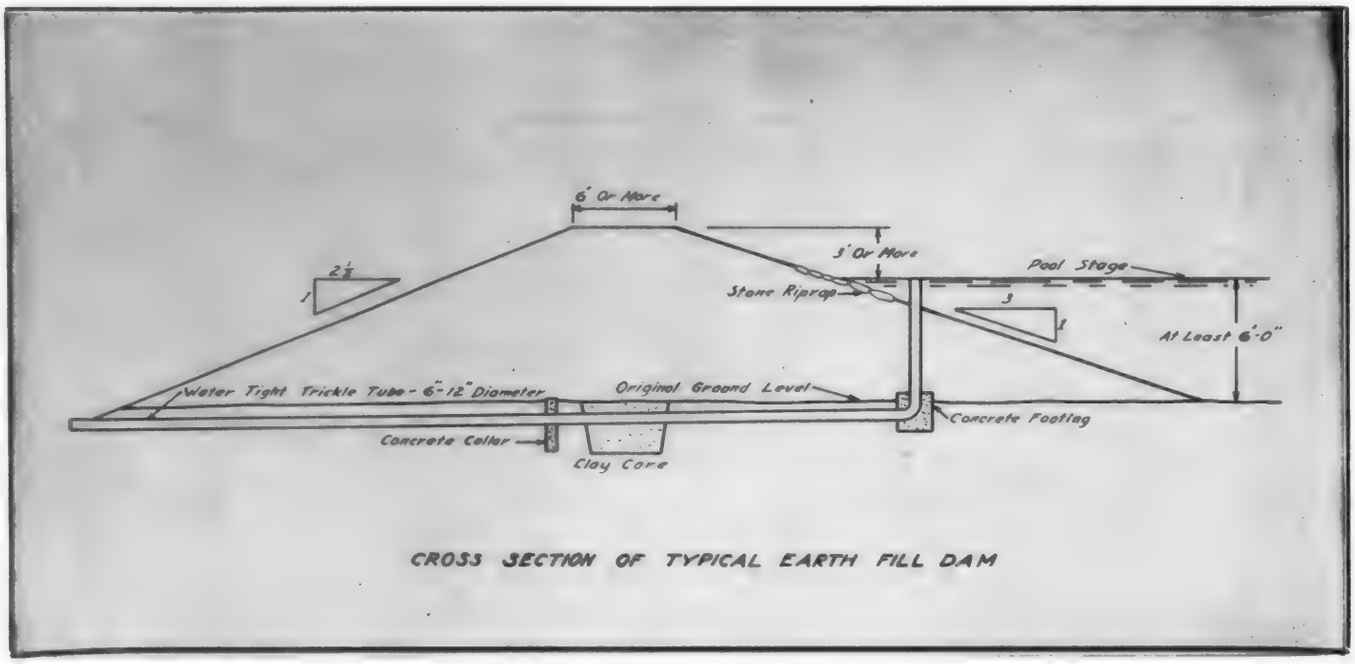
If all the overflow is made to pass over a grassed spillway, the soil will be saturated so much of the time that a good sod cannot be maintained. A small culvert or trickle tube through the dam and a few inches lower than the upper end of the grassed spillway will overcome this difficulty.

For large watersheds it will be necessary to construct a masonry spillway. Each job requires a special design. It is wise to secure the services of an engineer experienced in pond design for this type of work. A poorly designed masonry spillway is sure to fail and difficult to repair.

Mechanical Aids

Wherever possible secure the services of a contractor with suitable equipment to build the pond. Few farmers possess satisfactory experience, power and equipment to do a good job, except for very small ponds. A bulldozer is an excellent

(Continued on page 120)



SIDE SLOPES of the dam should never be steeper than shown. The settled height of the dam should be at least three feet above the level of the spillway. The trickle tube, which carries away the overflow, may be placed at one end of the dam as an ordinary culvert, but the outlet should be carried to the level of the valley floor. When the soil is pervious, a clay core is advised.

"How dear to my heart are the scenes of my childhood."

INVITATION TO MEMORY

Those who have left the land, almost without exception, expect eventually to return and the scenes of their youth grow stronger with the years. Memory does strange things. Often it seizes on some familiar object in the past and makes of it a symbol of deep and fundamental yearnings. The six photographs following represent such symbols, the material representation of the delights of a bygone day. Youth may here find the answer to one of its most pressing problems: In a confused world, the farm is a place of peace and good will. The titles are The Village Blacksmith, The Covered Bridge, Rabbit Hunting, The Spring House, The Country Store, and Bringing in The Cows.

The Country Store

The mail order house and the automobile, about the turn of the century, combined on a job of economic homicide. The victim was the country store, that rural clubhouse of a bygone generation. Traditionally, it shared one of the corners of a cross road with the church, the blacksmith shop, and the village pump and watering trough. The architecture was nondescript and by modern standards the store keeper as a business man was nondescript also. But he was an oracle, the arbiter of rural disputes, a prognosticator of weather, a Solomon of the cross roads.

He kept a set of books of his own design, for credit was the foundation of his business and barter was the accepted medium of exchange. Tenant farmers and laborers paid their bills once or twice a year, after summer and autumn harvests. Once a week supplies were brought from the county seat in a spring wagon drawn by a team of ponies.

Everything from safety pins to harness to postage stamps to perfume burdened the sagging shelves. Rats and mice were discouraged but never eliminated by a cat which slept in the cracker barrel and used a keg of nails for a toilet. The store was heated by a potbellied stove which glowed red hot on winter evenings and was encrusted with the evidence of countless near-misses directed at the box of sawdust near its base.

The store was opened at dawn and closed when the last loafer went home to bed. Neighborhood swains met here nightly, their only escape from the early-to-bed, early-to-rise steadiness of their homes.

It was on Saturday night, however, that the country store buzzed with the weekly marketing of the community which it served. Baskets of eggs, crates of protesting fowls, and sides of salt pork were pushed across the counter in exchange for plug tobacco, sugar, salt and print goods. Bologna and salt fish were the only meats sold. Occasionally there might be a string of bananas hanging where it could be easily watched. There were oranges at Christmas time and curious and wonderful new kinds of candy. A ring of buggy whips hung from the ceiling and the back room was a hodgepodge of harness, horse collars, barbed wire, and hardware. There were no fresh fruits or vegetables and the clothing counter catered more to utility than to elegance.

Card of admission and permit to sit by the stove was a dime's worth of cheese or a can of sardines which was supplemented by a handful of crackers from the open barrel near the stove. For summer sitters there were benches under the wooden porch.

When the store keeper installed his first modern equipment he signed his death warrant, for it was a gasoline pump. After that he didn't last long. Some diehards still hang on. They sell princess slips and lipstick, but there are no free crackers.

Bringing In The Cows

When the first tender green of new grass appeared in the spring the farm animals were turned out to pasture. To the boy on the farm fell the chore of bringing the cows from the fields, and from early spring to late fall the misty mornings and dusky evenings saw him, trudging slowly along the long lane to the pastures.

In the mornings, to his eyes still heavy with sleep and his senses not yet tuned to the realities of the day, the long lane became a highway into the unknown and his simple chore a journey full of danger and adventure. The mists distorted even the most familiar landmarks into strange and spectral shapes. Indians and robbers lurked behind the hedges, and beyond the hill, faintly outlined in the morning light, was a city and a harbor with ships. The experiences one might have were sometimes dreadful, sometimes exciting, but never dull. Often as a relief, from somewhere behind the curtain of fog came a familiar sound. the tinkle of old Nellie's bell, clear and distinct in the stillness. Nellie was bell cow of the herd and not far from her, browsing among the dew-laden clover, were the members of her entourage. It took a deal of shouting, supplemented occasionally by a clod or pebble, to get the herd moving. With Nellie in the lead, the cows and the calves and the team of horses in single file started for the barn where with the aid of the farm hand they were given a supplemental ration of oats and corn. There was no lagging at this job, for smoke was rising straight upward from the kitchen chimney proclaiming that breakfast was on the table. That, to the boy on the farm, was another adventure.

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Rabbit Hunting

The first snow of the season was the signal for a rabbit hunt. If the snow fell during the day preceding, so much the better. Not only does the cottontail feed at night but being a very sociable fellow he visits all his friends and is likely to indulge in a bit of horse play as well. Toward morning, after a night of foraging for apples buried in the snow in the orchard and a visit to the kitchen garden for choice bits of leftovers he "holes" up for the day. The new snow records all this for the hunter.

The rabbit knows he has left a map behind him and he has a special genius for making it difficult to read. He circles, back-tracks, and jumps sidewise into the track of another rabbit. While he usually confines his night activities to a small area, he sometimes will strike out across hill and dale just for the hell of it. He usually returns to his accustomed bailiwick where he makes a nest under a tuft of grass or weeds. A rail pile or shed floor sometimes provides a ready-made nest.

While dogs dearly love this sort of hunting they are really a handicap for they range too far afield and flush the game prematurely. The sport lies in the hunter's ability to solve the puzzle of the track pattern and to outguess the wily cottontail.

It was considered bad form to carry a scattergun on this type of hunt, for the rabbit is usually discovered crouching in his nest and the idea is to shoot him through the eye with a 22 caliber slug. If he is flushed he has won the game and is rewarded with an undisturbed escape.

Nature has camouflaged the rabbit perfectly by coloration and he is a master at supplementing this deception with some tricks of artful concealment of his own.

The game was dressed and hung on the clothes line out of reach of the cat to freeze. Fried rabbit with brown gravy and biscuits was by no means a minor factor in the enjoyment one got out of a rabbit hunt.

The Spring House

The pioneer looked for a spring and built his cabin near it, for he had no time nor equipment to dig a well. As he prospered he replaced his cabin with a better house, but the spring continued to quench his thirst and that of his animals, and supplied the only refrigeration known to generations. He built a stone trough and ran the cold, slow-flowing water through it. With stone from the fields he built a house over the spring and planted a tree near the door. The housewife placed her earthenware crocks of milk almost neck deep in the cold shallow stream, skimming off the cream for buttermaking. Dishes of food and leftovers of meat were set there for keeping.

It was always cool in the spring house, even on the hottest summer day. A gourd dipper hung from the wall and the men, coming from the hot fields, stopped first in the spring house for a draft of the cold water. The dog quenched his thirst from the overflow at the back of the spring house and a flock of ducks noisily investigated the trickling stream for worm and insect.

What a soul-and-belly satisfying experience to tip a crock of rich cold milk down one's parched throat after a morning in the fields. What an oasis at the end of the day when the body, dehydrated from long hours in the sun, called for huge gulps of water, cooled as it can only be cooled to human taste, by a journey through the dark and cold depths of the land.

The Village Blacksmith

The blacksmith is another of a vanishing race. Victim of the automobile and the tractor, he has become a symbol of the past. His forge is cold and his sons have become garage mechanics. The old-time blacksmith, in addition to his specialty, was a mechanic of no mean ability. His chief skill was that of an iron worker. He re-tired the wheels of buggies and farm wagons, repaired the metal parts of farm machinery, and in his spare time built sleds and an occasional wagon, painted buggies, repaired kitchen and barn utensils, and did odd jobs of welding and iron mongery. The blacksmith shop was the horse-trading center of a community, the clearing house for farm gossip and farm labor. Empty nail kegs supplied the seats for the village patriarchs. There the community wag and the inevitable town bum had their hangout. Here the village fool paraded his ignorance, the village wits traded their lewd banter, and the young bloods boasted about the speed of their horses or their girls. Small boys sometimes earned money for marbles by switching flies from restless horses.

The blacksmith shop kept all senses alert. There was the sooty forge, the sparks that flew from glowing metal under the hammer, the ring of the anvil, the pungent odor of a burning hoof under the heat of a hot shoe. There was the hiss of steam from the tub of water used for cooling hot shoes, and the sharp, animal smell of a sweaty horse; the blacksmith himself, with his bulging muscles, his hands so careless of the heat of a hot shoe; the pile of old iron, buggy wheel and wagon wheel rims, worn-out horseshoes, metal parts of this and that. Stomping at flies in the shade of a nearby tree were horses awaiting their turn to be shod.

The clientele of the blacksmith shop was strictly stag. To the men of the rural community, it was a truly masculine, comfortable, satisfying place.

The Covered Bridge

When our land was young, roads meandered here and there, following the lines of least resistance, crossing streams at shallows and seeking the levels of valleys. After a while bridges became a necessity and since iron and steel were scarce what was more natural than that they should be built of timbers cut from the forests.

To protect the floor from the elements many of these bridges were roofed and walled. They were marvels of engineering art and some are standing today as monuments to the indestructibility of oak and the sound craftsmanship of their builders.

That the covered bridge is picturesque is purely an accident, for it was severely utilitarian in its planning. This high utility was wed to an architecture which harmonized with rural scene as naturally as the log cabin.

Often located to serve more than one road, the covered bridge became a sort of focal point for the rare travelers of the pioneer era. On hot days the farmer, hauling a load of grain to the mill, rested himself and his sweating team in the cool shade of the covered bridge. During summer storms it became a safe haven for the traveler and the farmer caught on the road. On rainy days it sheltered groups from neighboring farms gathered there to chat and whittle. Small boys liked to fish and swim in the shady pool beneath its huge timbers and they built fires against its stone buttresses to take the chill from early fall days.

Many a rural romance was consummated in the deep shadows of the covered bridge. A transparent but pleasing strategem, no doubt invented by some resourceful swain, had it that every plank crossed called for a kiss and rural lotharios sought out the longest bridges for their Saturday night courting. It was indeed a romantic spot on an autumn night. The moonlight made patterns on the plank floor and from the brook came the subdued conversation of the water. The swallows chirped from their nests under the eaves and Old Dobbin switched imaginary flies, willing to rest while his master pressed the hand of his best girl.

A few of these bridges, some more than a century old, are still found in New England and parts of the middle west, but they are fast disappearing under the demands of modern transportation. The hewn oak timbers, which saw the dawn and dusk of an era, are being replaced by less picturesque but more practical reinforced concrete and steel.

ANGRY CLOUDS boiling high, a storm approaching and the haying unfinished. This was the haymaker's nightmare until engineers learned how to sidestep the effect of adverse weather on hay by drying it artificially in the barn.

THE GAMBLE'S GONE FROM HAYING

By R. C. MILLER

EARLY LAST winter a hundred-odd men climbed the dusty ladder to the mow of a barn on a T.V.A. experimental farm near Knoxville, Tennessee. They represented the agricultural experiment agencies of many states. Among them were the agricultural attaches of the Norwegian and Dutch governments in Washington. They listened intently while a man in high boots and leather jacket explained a strange looking contraption built of rough lumber and laid out on the floor of the mow.

"This," he said, "is the result of several years of experiments in building a hay dryer that will take the gamble out of haymaking." A practical farmer as well as an agricultural engineer, his soft Tennessee drawl blended with the murmur of a pouring rain on the shingle roof. "Rain and a scorching sun ruin many million dollars worth of hay every year," he said, "and we here in the Valley decided to do something about it. I want to tell you that we have now developed artificial hay drying to the point where it is practical for every farmer who stores hay."

The very attentive Dutch attache wore a R.A.F. uniform, but was obviously more of a farmer than an aviator. "In my country," he said in his precise English, "we string hay on poles and hope the sun will come out long enough to dry it. A workable hay drier will revolutionize the dairy industry in Holland where much of our valuable hay is spoiled by frequent rains."

An old fellow, obviously a native of the Tennessee Valley, stood on a bale of hay and cupped his ear to the speaker. "Funny looking jigger," he said. "Probably won't work."

Short of a miracle of nature, most of us thought the traditional gamble would never be taken out of hay making. Yet the agricultural engineers are in a fair way to

WHEN HAY GETS WET it means extra operations, and partial or total loss of the hay. These three men are "doodling" damp hay so that it will dry out with a minimum of leaching. A hay dryer often eliminates the extra jobs, produces better hay, and holds in the protein because the hay can be stored before the leaves begin to shatter and the stems to break.

HAY DRYERS developed by the T.V.A. engineers are variations of the type shown above—a main air tunnel down the center of the barn with flues extending at right angles. This type takes up a minimum of space but because of the smaller main tunnel air pressure must be higher. In this large barn there are two fans and two sets of tunnels, one at each end of the hay mow.

performing this miracle. The trick is to force air through the mow to complete the curing of hay that is stored wet.

The engineers used a very simple natural law, a law which every housewife makes use of when she hangs the Monday wash out on the line. The moisture is picked up by the atmosphere and carried away, leaving the wash dry. Applying this principle to the moisture in hay, the engineers reasoned that wet hay could be cured right in the mow.

The resulting contraption which does just this is about what you would expect. A blower fan, driven by a motor, forces air through a series of low, squat tunnels beneath the hay. The air, leaving the tunnels through cracks made for that purpose, picks up moisture as it is driven through the hay by the pressure from the fan.

This was not as easy nor as simple as it appears. Once the basic idea was originated, the engineers had to decide such things as fan and motor sizes, the shape and size of air tunnels, and the amount of air pressure required.

The final shape looks much like a series of animal runways. As one farmer said when he saw the Tennessee layout on the floor of the mow, "What a hot time a cat would have chasing rats in those tunnels."

Physics I (A Quick Review)

Atmosphere has the very convenient quality of holding moisture in suspension in the form of invisible vapor. And the warmer the air the more moisture it will hold. This quality of air comes in handy in hay drying, for the hay has a tendency to generate heat when it is stored damp. The heated hay warms the air being forced through it, increasing the capacity of the air to hold moisture. Therefore, the more hay heats the quicker it dries. Evaporation cools the surface of an object, as one can discover by wetting a thumb and blowing on it. The hay, therefore, is cooled as the moisture departs. A by-product of this cooling is by no means hard to take on a boiling July afternoon. There is a much lowered temperature in the hay loft, a good way to keep the hired man happy. The temperature in the mow employing a hay drier may be as much as fifteen degrees lower than the temperature outside.

Overheating of hay was one of the bugaboos of the old fashioned method, for overheating darkened the hay and destroyed some of its nutritive values. Heat damages hay and sometimes gets it hot enough to burst into flame. With a hay drier installed, this hazard is a worry the farmer can write off. It is very likely that fire insurance companies will soon lower rates on barns equipped with artificial hay driers.

If one thinks of air as a tangible substance which has weight and volume, the principles of air pressure become simple. The fan forces air into the opening of the tunnel and this air keeps pushing the air in front out through the cracks beneath the tunnels. The air circulates between the spaces in the hay, forced upward by the constant pressure from beneath. As it is forced upward it loads up with moisture and finally escapes from the top surfaces. As long as there is an air space between particles of hay, no matter how small, air will circulate. Baled and chopped hay may be dried by this method, but it is more difficult. One difficulty is that, unless a small amount is dried at a time, the air pressure must be greater, which means a larger fan.

THIS IS THE TYPE of dryer developed by engineers at Ohio State University. The main air tunnel is large enough for a man to walk through, permitting the closing off of unused flues. The main tunnel occupies more space than that of the T.V.A. type but the center of the floor is less obstructed and the air is under less pressure, requiring a smaller motor. For larger units dimensions increase.

The average operating cost per ton of curing hay by the mow ventilation system varies from 50 cents per ton to $1.50 per ton, depending on how wet the hay is when it is stored. The high figure, if a higher grade hay is produced, is still ridiculously low in comparison to the gain in quality and return. The differential in the prices of first grade and sample grade hay is so great that almost any operation that would produce first grade hay would be economical.

How to Install a Hay Drier

Let's take an average 50 to 200 acre farm and install a hay drier in the barn. In the mow we find the floor is in fair condition but there are places where cracks must be covered with tar paper in order to prevent the escape of air downward. The owner tells us that he usually stores alfalfa or other hay from a twenty acre field and that his maximum crop is about forty tons. Since each ton requires 500 cubic feet of air per minute for good drying, we multiply 40 by 500 and find that we shall have to have a fan with a capacity of 20,000 cubic feet of air per minute. A fan manufacturer advises us that a five-horse power motor will do the job and the total cost of fan and motor will be about $285.00.

Since the mow is thirty feet long, we shall need material for a main air tunnel thirty feet long, three feet wide, and approximately six and one-half feet high. This can be constructed of panel material such as plywood or asbestos cement board or rough lumber covered with tar paper to make it air tight.

From this main tunnel, which is set up along one wall of the mow, will extend, at six foot intervals, smaller ducts running at right angles across the floor to within three feet of the opposite wall. These air ducts are made of rough lumber, approximately one foot square, with an open bottom side on which are nailed cleats at two foot intervals to permit the air to escape beneath. They may be made in sections, to telescope one into the other for storage or convenience of removal as the hay is removed from a part of the mow. They are fitted snugly into slots in the main tunnel and the opening is fitted with a removable door to permit the shut-off of air from any particular tunnel.

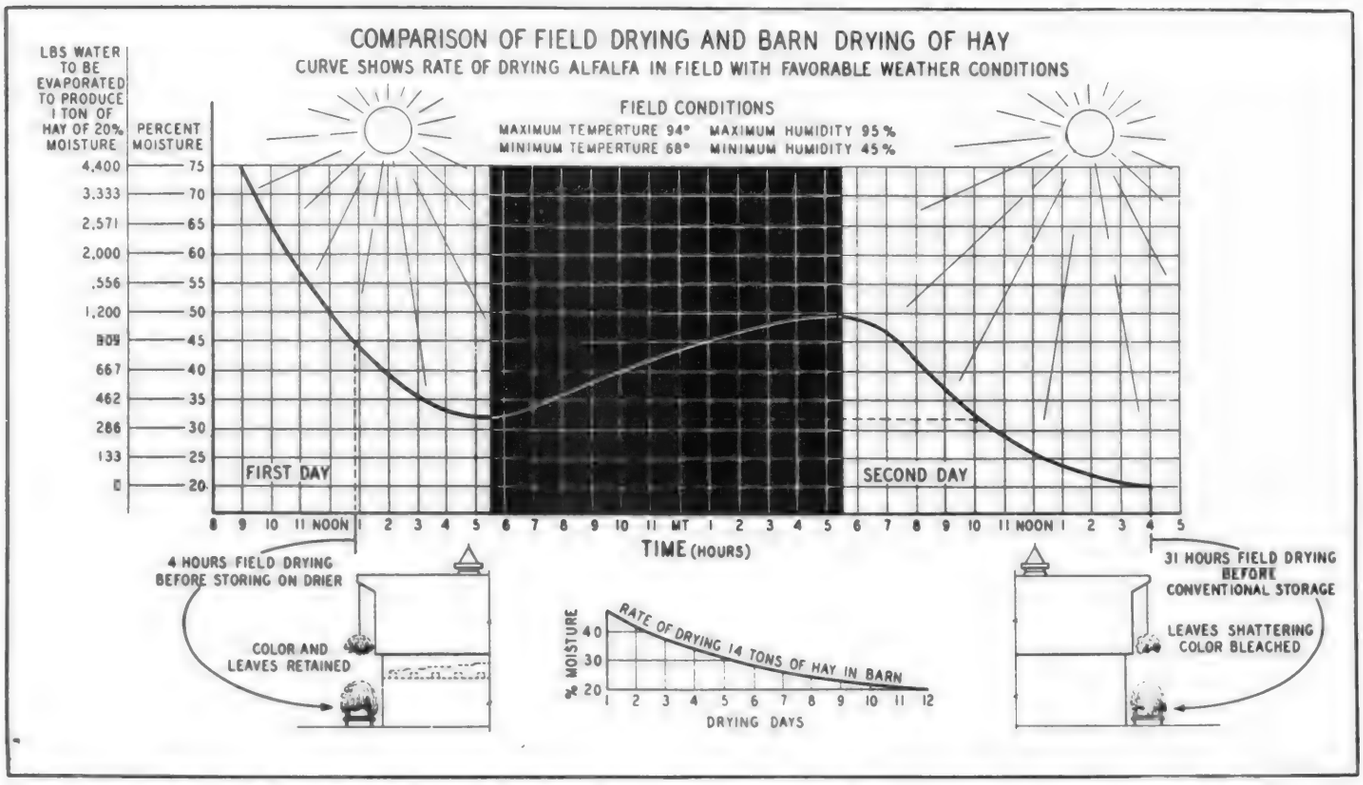
The motor and fan are set up at the end of the master tunnel. This installation may open on the outside of the barn or it may draw air from the lower part of the barn, doing double duty as an air conditioner for the stock. If it opens to the outside, the fan and motor must be protected from rain.

Often the fan is the only piece of equipment the farmer need buy. A motor or gas engine used for other purposes can be diverted to the blower fan during haymaking. Total costs will vary, depending on how much work the farmer wants to do himself and how much of the equipment and material he has to buy. For our forty ton mow described above, the cost of fan, motor, and lumber would be about $350.00. Labor would be extra. Fans used with grain elevators, silage cutters, and threshing machine blowers are not adapted for this work. Both the propeller and multi-vane types are used, depending on the type of drier installed.

The best way to check your estimate on what type and size of fan to buy is to inquire from a fan manufacturing company.

Two Systems, Both Good

The type of system which has been developed in the Tennessee Valley differs slightly from the so-called Ohio system, developed by agricultural engineers at Ohio State University. The former favors a small main air tunnel (approximately two feet high by three feet wide down the center of the barn floor); the latter a large wind tunnel, built along one wall. The former uses a tapered tunnel to attain


COMPARISON OF FIELD DRYING AND BARN DRYING OF HAY
CURVE SHOWS RATE OF DRYING ALFALFA IN FIELD WITH FAVORABLE WEATHER CONDITIONS
LBS WATER TO BE EVAPORATED TO PRODUCE 1 TON OF HAY OF 20% MOISTURE
PERCENT MOISTURE
FIELD CONDITIONS
MAXIMUM TEMPERTURE 94° MAXIMUM HUMIDITY 95%
MINIMUM TEMPERTURE 68° MINIMUM HUMIDITY 45%
FIRST DAY
SECOND DAY
TIME (HOURS)
4 HOURS FIELD DRYING BEFORE STORING ON DRIER
COLOR AND LEAVES RETAINED
RATE OF DRYING 14 TONS OF HAY IN BARN
% MOISTURE
DRYING DAYS
31 HOURS FIELD DRYING BEFORE CONVENTIONAL STORAGE
LEAVES SHATTERING COLOR BLEACHED

THIS CHART is chuck full of information about how hay dryers bring restful nights to farmers. Hay cut at 8:00 o'clock can be stored at noon over a dryer, the moisture having been reduced in four hours to 45 per cent from 75 per cent. By evening, if you are waiting for it to dry in the field, it still contains 35% moisture and you have to leave it out overnight. It picks up moisture during the night and by morning the moisture has gone back to 50 per cent. It cannot be brought in until 4:00 o'clock the next day, 31 hours after cutting. Those are vital hours and often endanger the margin of safety. Modern weather forecasting is accurate enough for a farmer to plan his cutting four to six hours ahead, but may fall down on a 31-hour forecast.

a uniform pressure whereas the latter uses a large tunnel to attain the uniformity. Both systems may use high or low pressure fans. The results are the same. The Tennessee system requires a larger motor and a multivane type of fan; the Ohio system requires a larger tunnel and a smaller motor and a propeller type fan.

How It Works

When the hay is brought to the mow it should be spread uniformly over the flues so that air pressure is not lost over the thin places. The fan should be started as soon as a thin layer of hay covers the flues. The hay can be stacked over the flues to a depth of from six to twelve feet, depending on how wet it is. If it is over 35% moisture it should not be stored more than eight feet deep. The drying process starts at the bottom and moves toward the top so that when the top is dry you know that all is dry. Later cuttings are, of course, placed over the first. After the hay seems dry, it is advisable to operate the fan for an hour or two each day for several days to be sure no hot spots are developing. Such heating may be detected by walking over the hay when the fan is operating. A hot blast indicates a hot spot beneath.

Let us take a look at how a typical case may work out during a spell of poor haying weather. A farmer may decide that he wants to make alfalfa hay on June 1st, the weather being clear. He starts cutting down early in the morning. The sun is hot and it dries the alfalfa enough so that by late morning he rakes it into a windrow with a side delivery rake. By early afternoon, it is dry enough to handle and store in a ventilated mow, but it is still far from dry enough to store in the old type mow.

Late in the afternoon a thunder shower comes up or there is a heavy dew that night and if the hay is still on the ground it will take until the next afternoon to dry sufficiently to store in an unventilated mow. In that case, it will have to be turned and the sun will have bleached it out, valuable nutrients will have been lost, and there is much shattering of leaves in the handling and drying. In desperation the farmer often risks mold and heat damage, if not fire from spontaneous combustion, by storing it a little too tough or wet. All this means that in unsettled weather hay can be stored and cured in a ventilated mow. It requires from two to three weeks to dry the hay. The fan is usually operated continuously for the first week and after that only during a part of the day. Even when the humidity outside is too high to permit much drying to be done by the fan, the circulation of air will keep down the heat.

When the hay is very heavy or when it is very wet from rain or dew it may be a week before it can be stored under the old methods. During that time it must be turned often, occasional hot blasts of sun will bleach it, and the result is a very inferior quality. For when the color disappears many of the vitamins and minerals disappear also.

The most common question which occurs to those who are considering installation is, "How do I know when to store the hay?" In answer to this one farmer says, "I put it away just before it is dry enough by the old method." Another says, "A hay loader will not handle wet hay. I wait until it's just dry enough to load." This is before the leaves begin to shatter and before the stems break when twisted. Hay which is stored under the old method must be dried to twenty per cent moisture or less. At thirty or thirty-five per cent moisture the leaves begin to shatter and at that point it starts to bleach and the nutrients start to leave via the way of heat and the action of light and the sun's rays. Hay may be safely stored over a drier when less than half as dry as by the old method; that is, when it contains 40 to 50 per cent moisture.

The Gimmick in the Works

Every new invention tows with it some disadvantages of its own making along with the benefits. Let's examine the disadvantages of this new system of hay drying.

The first disadvantage is small, but prickly and worth noting. Since the hay will be picked up from a half a day to a full day after it is cut, it will weigh considerably more than hay that is picked up after being out in the sun for three days. Somebody has to do a little heavier job of lifting. There is no additional work, of course, in cutting the hay, nor in putting

it into windrows with a side delivery rake. If the hay is picked up by a hay loader, the first additional work occurs when you fork the hay from the hay loader into the wagon. Each forkful weighs a little more because the hay has a higher moisture content. Usually, hay is brought in at 20% moisture. Under this new way of hay drying, the green hay may be brought in at a moisture content of 50%.

The next point at which the hay is going to show its weight is when it is spread over the floor of the barn. After the hay is dropped on the floor and is spread, each forkful weighs up to one-half as much more.

A disadvantage which will affect farmers who own lightly constructed barns is that wet hay is going to weigh more and might cause the floor of the barn to sag. If you're bringing in the hay from 20 acres and your first cutting was 16 tons, at 20% moisture, this same hay will weigh proportionately more depending on the moisture content as shown by the accompanying table.

Wet Hay Weighs More

Here's how much more one ton of hay will weigh when its moisture content is increased by being brought into the barn before it is dry.

Moisture Content	Weight
20%	2000
25%	2134
30%	2285
35%	2460
40%	2666
45%	2910
50%	3200

Hay containing more than 20% moisture cannot be stored safely without the use of a dryer. Hay containing up to 50% moisture can be stored over a dryer. When storing over a dryer, to get one ton (2000 lbs.) of dry hay (20% moisture) you must handle 2460 lbs. of hay containing 35% moisture; 2666 lbs. containing 40% moisture; and 3200 lbs. containing 50% moisture. From this table you can figure the added weight that each cutting of wet hay will add to your barn floor.

On the second cutting, if you bring in 13 tons, the total weight that the barn floor supports is again increased by the moisture content as shown by the above table. On the third cutting, if you bring in 12 tons, the barn floor gets its first added strain under this method. If you are bringing in hay from a substantial number of acres, the additional weight of this third cutting may run into real tonnage, so check your floor first to see if it will support it. In most cases it will, but it is a point that should be checked.

The third disadvantage of this method of hay drying is that during February when you might get down to the last bit of hay in the barn, you have to crawl over the wooden tunnel on the floor of the barn when you fork up the hay there to feed the cattle. However, the flues running off the main wind tunnel are not nailed down and telescope into each other. They are easily picked up and offer no problem. Under the plan devised by the T.V.A., there is a permanent wind tunnel down the center of the barn floor that is about three feet high. This is an obstacle when picking up the last hay off the floor.

To knock out this obstacle, plans drawn by Ohio State University, and other experimental agricultural schools, provide for a wind tunnel permanently installed in one side of the barn. The wooden flues run out at right angles from the bottom of this tunnel and since they telescope into each other and are not nailed to the floor,

A HEAVY CROP of hay will take a long time to dry in the field. The heavier the crop, the more damage is done by rain, for once the hay next to the ground is wet, it dries slowly and may mould. It has to be turned, and the sun then gets in its licks, leaching and bleaching the nutrients and laying the stage for excessive shattering and breaking of stems.

THE OPENING from the motor compartment to the main tunnel. A screen fitted over this opening will keep the hired man out of the fan and save the barn cat as well.

THE FLOW of air can be directed to any part of the mow by means of hinged doors which open from the main tunnel into the individual flues.

WOODEN FLUES should fit snugly into the openings provided for them in the main tunnel wall. Build them sturdy for there will be a lot of weight on them.

DOUBLE-THICKNESS CLEATS on the bottom of the flues insures more air circulation through chopped hay, which will go into this hay mow. Requiring less space, chopped hay compensates for a small mow. The sides of the main air tunnel, made of plyboard and faced with tar paper, are reinforced against the weight of the hay by up-right two-by-fours. Though sturdy, the individual flues are light and can be put aside as the hay is used.

HERE'S HOW an Ohio farmer installed the motor and fan for his hay drier system in a small room at the head of the wind tunnel. A hinged door protects the equipment from rain and sun and a screen keeps out dirt and prevents birds from being "blitzed" by the whirling fan blades.

they can be picked up as you get down to the last two or three tons on the floor.

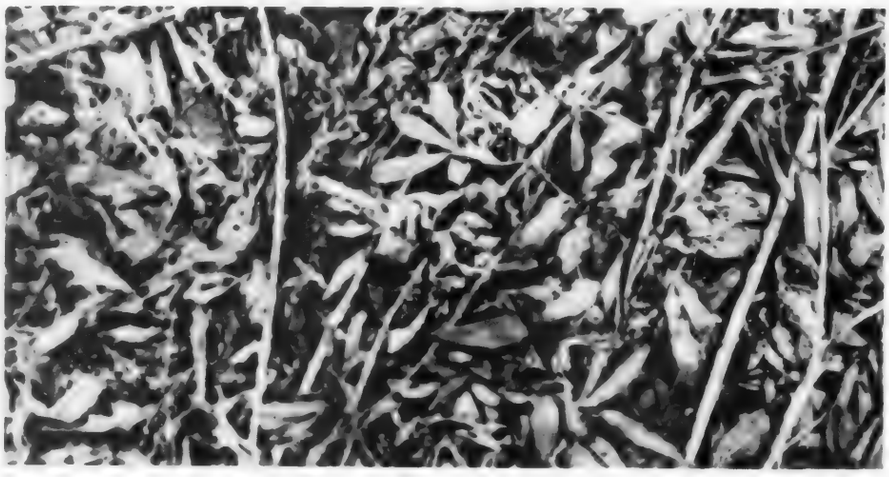
The next disadvantage is that you have added two more pieces of mechanical equipment to the farm, namely, the motor and the fan, and with them the resultant problems of maintenance that arise in any piece of equipment. A motor, of the type recommended, and any of the standard electric fans available are fool-proof and give very little trouble. However, it is still more pieces of equipment to think about.

None of these disadvantages are serious but they are there and should be looked at straight in the eye.

The Payoff

The advantages of this new hay drying system are equally great to the man who sells his hay or to the man who feeds it to stock. Hay that is sold through standard grain markets is graded U.S. No. 1, 2, 3, and Sample. The prices quoted in the daily newspapers are always for U.S. No. 1 hay unless it is otherwise stated. When the leaves shatter, or the color is dark, or the fragrance is lost, or the hay bleached, the price drops by as much as 50% because the hay in turn has lost that much in value as feed. In milk, more than in any other farm product, hay is the essential ingredient. If the cows have all they want of high protein, good color hay with the Vitamin A still in it because the sun and the rain didn't have a chance to wash it out, the feed and health problem is nailed down. Not much hay is cured that has good color and is high in Vitamin A and contains 15% protein. Cows that will produce 10,000 pounds of milk and 450

NO FANCY JOB of carpentering, but these flues are sturdy and serviceable. This shows how the small air tunnels telescope and how the hay is piled on top for drying.



AT 35 PER CENT moisture the leaves of hay begin to shatter. At this point or before, it can be stored over a dryer and the leaves saved. Most of the food value of hay is in the leaves. If the leaves are gone, gone also is most of the Vitamin A contents.

THIS HAY has been allowed to dry to the 20 per cent moisture content necessary for conventional storage. Animals fed this hay get a belly full of stems, little actual food.

pounds of butterfat on this kind of fine hay will drop to 8,000 pounds of milk and 320 pounds of butterfat on hay that has been rained on hard and lain on the ground for several days under a blistering sun. The increase in milk production of six good cows in one year will pay for installing this new system of hay drying if the farmer who has previously been getting a U.S. No. 3 quality of hay from his fields and is not able to get U.S. No. 1 quality.

There Ain't No Such Animal, He Said

The usual reaction of the farmer to this new way of hay drying is: "It won't work" and he may offer the following reasons: First, that after the first cutting is stored in the mow and the second cutting put on top of it, the air from the wind tunnels will not be able to force itself up from the floor into the first cutting and then into the second cutting. Cautiously, the average farmer will say that the special reason why the air won't get up through the mow into the second cutting is because the first cutting was wet when put in, and packs itself so tightly that air won't go through it. The only answer to this is that the farmer is wrong and that the engineers are right. The air from the wind tunnels does go through the first cutting even though it is packed tightly and does rise in the mow to the hay in the second cutting and it dries "as advertised."

The farmer's second objection will be the same as the first only more so, namely, that even if the air could force itself up from the wind tunnels on the floor through the first and second cutting, it will not be able to rise past them into the hay of the third cutting. Once again the farmer must bow to the skill of the engineer. The air will rise and dry the first, second, and third cutting. Baled hay and chopped hay, which are more closely packed than loose hay, are dried successfully by this system.

Certain fundamental truths about farming are realized instinctively by some men. Yet others, never in their lifetime, no matter how many books they read, or acres they plough, manage to grasp the plain facts about farming that every successful farmer has always known. Paramount among these plain facts is that a plentiful quantity of high quality hay is the "must" ingredient of profitable stock farming. George Bungle, the late great comic strip character, once said: "Business is easy. All you have to do is take in more than you pay out." In the same way, stock farming is easy—all you have to do is have plenty of high quality hay. This new hay drying method provides a practical way for every farmer with a barn and a field of hay to put in a system that will insure him of high protein, good color hay year after year.

THE SEASON'S OVER, THE HAYING'S DONE

Mr. and Mrs. Sylvester B. Moore of Skowhegan, Maine, in the best tradition of American farmers, have stored their bins and cellars and mows for the long New England winter.

THIS CHARACTER, with a sweet tooth and sinister motives, will cut down a tree to fill his pail with honey. Hollow trees and overgrown fence rows once sheltered sufficient bees to insure a fair yield of seed. For the folly of felling the trees and clearing the fence rows the farmer must pay.

THE BUSY LITTLE BEE

"NO BEES, NO SEEDS," SAY THE SCIENTISTS

A FEW years ago, Floyd Brown, a farmer of Green County, Wis., went to his county agent with a problem in clover seed production. His fertile fields grew tall, healthy-looking crops of clover, but the yield of seed had each year grown smaller until it reached the point where he threshed scarcely enough to pay for the operation.

After investigating the probable reasons for the decline, the agent suggested that Floyd Brown buy several colonies of bees and set them up near his clover field. Next autumn, more than three times the seed he had threshed the preceding year was taken from the field.

Alsike, medium red, white Dutch and ladino clovers are practically self-sterile; that is, they do not fertilize themselves and are dependent upon insect pollination to insure cross-pollination and subsequent seed set. Sweet clover, mammoth red clovers and alfalfa vary in their degree of self-fertility, but in all cases are dependent on insect pollination to insure self and cross-pollination so necessary for profitable seed yields.

The flower structure of all these legumes make wind pollination a negligible factor.

In the mid-west, crops and fruit trees almost entirely dependent on insects for pollination are the legumes (the clovers, alfalfa, and various beans); apple, pear, plum and cherry. The vegetable crops include cantaloupe, squash, cucumber and pumpkin.

The pollination job necessary for an acre of legume bloom is cosmic. For example, an acre of alsike or red clover blooms contains 400,000,000 and 216,000,000 florets respectively. To have 100 per cent pollination occur, each floret must be visited by a pollinating insect. Under field conditions this would seldom happen. However, under experimental conditions where 100 per cent pollination took place with alsike clover bloom, yields varying from 12½ to as high as 20 bushels of seed

RAIL FENCES and hillside woodlots overgrown with weeds and brambles will invite many a wild bee colony. Dogwood and wild spring flowers will give them a good start until the clover fields come into bloom.

A WHIFF of rag smoke will reduce the most belligerent bee to a very docile creature. The net is a protection against absent workers returning to the hive.

A POLLEN-LADEN bee enters this trap where the pollen he carries is brushed off. It is then checked to determine what kind of a job of pollination he is doing.

an acre have been harvested. This is amazing in view of the fact that the average 10-year average yield of alsike seed per acre is only 1.6 bushel.

Seed Yield Boosted

The ten year average yield of clover seed per acre in the midwest is one bushel. With maximum insect pollination and ideal growing conditions, as much as 12 bushels per acre have been grown on fields no more fertile than those which averaged one fifth of that when the bee population was inadequate. Let us see what that means in dollars and cents to the farmer. At the present time red clover seed is selling for a little more than $20 a bushel. This includes $3.50 per acre payment which the federal government is paying in order to rebuild the normal supply of the seed. To farmers achieving better pollination this return per acre would be, at a conservative estimate, more than three times this amount, or about $60 more per acre. Incidentally, an average yield of seed will return as much or more in money than if the clover was cut for hay.

The legume pollinating insects may be classed in two groups; namely, the natural pollinating insects over which we have little control; and the honey bee, the only domesticated insect. The uncontrolled pollinating insects, which play a meager part in legume pollination, are bumblebees, solitary bees, flies, butterflies and moths. If you would go into an ordinary field and collect all the natural pollinating insects you would possibly collect not more than nine in an hour. If the field is sufficiently populated to insure the maximum crop you would need to collect from 200 to 300.

In our grandfather's day there was a yard of bees on every farm and the fields and fence rows were full of wild bees' nests. Both the honey bee and the wild bee have declined in recent years and as a result there has been a very definite decline in the quality and quantity of certain farm crops, particularly clover seed, fruits and melons.

With shortage of labor on the farm, the modern farmer is more pressed for time than his grandfather, and the once-common bee hives are disappearing from the traditional sheltered orchard nook, because of the occasional care required. The wild bumblebee is suffering a like fate because fence rows and stream margins have been cleaned up, pastures grazed to the grass roots, and wood lots cleared. The wild bee has no place to nest.

Since man in his stupidity has thrown a wrench into nature's machinery for pollinating blossoms, he must supply the missing pollinators himself.

No 40-Hour Week for Bee

The honeybee is ideally fitted to accomplish this pollination job. Its social organization makes possible the development of enormous colonies which may be placed in any desired location in the numbers necessary. The honeybee's instinct to work every waking hour is an asset which few

of man's domesticated creatures have.

There are four ways of supplying the honeybees necessary for a maximum seed yield. The seed grower may buy a yard of bees and care for them himself; he may rent sufficient colonies from a bee keeper during the blooming season; he may buy package bees, releasing them each season in his fields and writing them off after the crop is pollinated; or he may induce a bee keeper to move a yard of bees to his farm in return for a free apiary site near an abundant source of pollen and nectar.

If the farmer decides to be his own bee keeper he will find there is much to learn, but that the learning is interesting and not as difficult as one might think, for while the keeping of bees as a means of livelihood requires long experience and is a full-time job, the maintenance of a few colonies for the purpose of pollination is little more than a matter of common sense, a few evenings with a book on bees, and periodic inspections. The total amount of time needed to care for a colony of bees is surprisingly small, perhaps an afternoon three times a year.

There is a county agent at your service in every county in every state in the United States. If he cannot answer the problems that arise while you are learning to care for your bees he knows someone who can, and will readily cooperate with you.

Most states maintain extension departments supplied by a beneficent government which deal directly with the farmer and many of the departments offer extension courses in bee keeping.

The farmer who keeps bees for the pollination of crops need not pass up the possibilities of taking off surplus honey for family use, and to sell in what the present time is a greedy market. An average colony of bees will produce 50 to 100 pounds of strained honey per year and honey is now selling at retail for as high as 50 cents a pound in fancy packages. Comb honey is selling for 35 cents a pound.

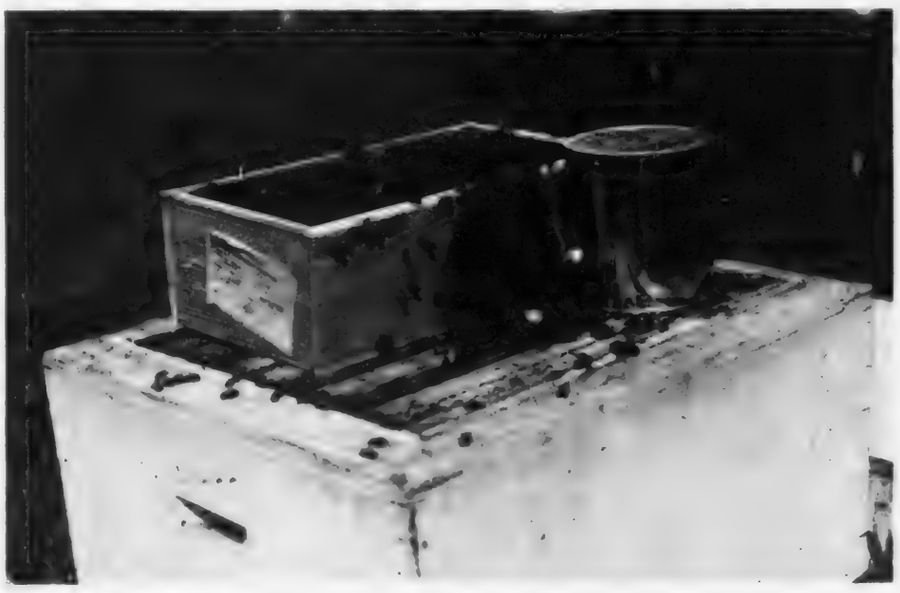
If the bee population needed is larger than that supplied by the modest number of colonies a farmer can care for conveniently, these may be supplemented by the rental of colonies from bee keepers. Any farm agent will provide the names of reputable bee keepers who supply this service.

Since the range of a bee is not much more than two miles, commercial bee keepers find that there is a limit to the number of colonies which can be supported in a given area. Groups of colonies above this number are often "farmed out" to orchardists and seed growers. They are transported to and from areas of abundant nectar and pollen, a favorite being red clover or alsike fields coming into bloom.

While farmers with immense fields of legumes find package bees inadequate for maximum pollination, many orchardists and small farmers rely solely on this method.

IN EMPTYING package bees, dump some over the queen to protect her against chill.

THEN PLACE the remainder near the hive entrance. They'll soon join the queen.



POLLEN AND HONEY left by former tenants will give package bees a good start.

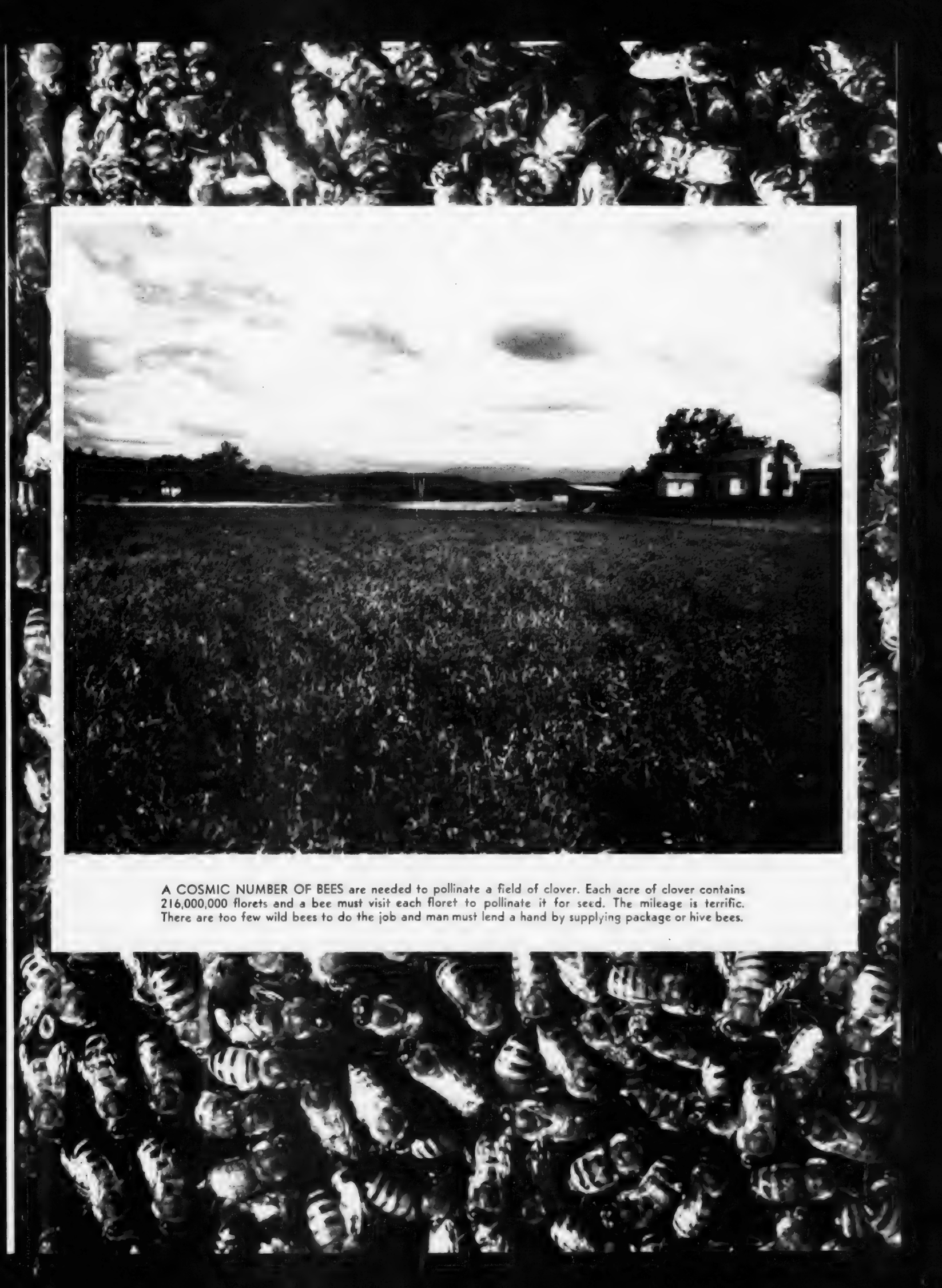
BEES do not require palatial homes. This Ozark farmer trapped a swarm from a bee tree, and installed it in a home-made hive fashioned from a hollow log.

The package bee industry, a relatively new industry, has had a great success during recent years. The industry is confined to the southern states because the advanced spring season permits colonies of bees to reach near-swarming strength before weather in the north is mild enough for extensive brood rearing.

Package bees are sold by the pound in two, three and five pound lots and are shipped by express or mail. If they are to be used for one season only they may be placed in an advantageous spot in the orchard or green house in the original shipping package. Larger packages should be transferred to hives, a relatively simple operation. If you want to do this you'll need a hive, which can be bought knocked down at any country hardware store, a smoker and a net to drape around your hat to keep the bees out of your hair. This whole outfit should not cost you more than eight or ten dollars.

A farmer who wishes to start modestly in bee keeping may purchase package bees complete with queen, and by the proper care can increase his colonies from this original. A normal increase results in double the number of colonies each year, each healthy colony being divided annually and supplied with a queen.

Bee equipment can be purchased from most country hardware stores and from farmer supply houses. It might be wise to caution the beginner not to be frightened by the vast amount of literature on the subject of bee keeping. Start with simple instructions to beginners, learn from experience, and leave the heavy volumes and multitudinous bulletins for later. Some successful bee keepers have never read a book.



A COSMIC NUMBER OF BEES are needed to pollinate a field of clover. Each acre of clover contains 216,000,000 florets and a bee must visit each floret to pollinate it for seed. The mileage is terrific. There are too few wild bees to do the job and man must lend a hand by supplying package or hive bees.

How Deep, O Lord, How Deep?

By J. C. HIDE

OUR pioneer forefathers brought with them from the east a method of tillage or seedbed preparation which has persisted until recent years. For generations few farmers doubted the soundness of this "Standard" method of preparing the soil for seeding. As introduced into the twelve or fifteen states of the middle west, the method has been pretty generally as follows:

1. A mould-board plowing which turns the soil and sometimes subsoil to a depth of six to eight inches. Plowing is done either in the winter or spring.

2. A second operation to further pulverize the soil, usually done with a spike tooth or spring tooth harrow or disc.

3. Planting.

This method with minor variations and occasionally with some additions as dragging and rolling has been universally followed in preparing the soil for corn, the stable crop of the middle west. Where wheat follows corn, the first operation is usually omitted.

In general, farmers believe that when sod-land is to be broken for planting other crops, a deep method of tilling similar to mould-board plowing is necessary.

From Connecticut to Kansas farmers used about the same method of tillage regardless of conditions. Such factors as depth of soil, nature of the subsoil, deposition of crop residues, wind hazard, precipitation and necessity of weed control have had little influence on the manner of tillage.

In recent years, however, soil experts

with the aid of extension departments and county agents have greatly increased the understanding of tillage. Most farmers now know that different crops, soils, and seasons each demand varying procedures and methods.

That the time worn methods are not infallible was a painful discovery. The controversy broke into books among which is *"Plowman's Folly."* Neighbors have cooled toward each other because they could not agree on how deep to plow, what tool to use, and when to use it.

Farm scientists seek to convince the average farmer that tillage is his own problem for his own particular field and that he must apply scientific methods in its solution. There is no general formula which all farmers can follow.

WHAT ARE these problems of tillage? They have so many angles that only close thinking and patient practical application of all the factors will provide the individual farmer with the answer for his own fields.

It is probable that prehistoric man made two observations which induced him to start to till the soil. These were: First, that seedling plants could not compete successfully with established plants and, second, that the seed had to have good contact with moist soil in order to germinate. He was probably unaware that in his tillage operation he had also influenced the amount of water that entered the soil during rains and the amount of free air movement in the soil. Students of the soil have nailed down four major objectives of tillage. The incorporation of crop residues is frequently included as a fifth objective.

Weed Control

The first of these objectives, "weed control," is attained when competing plants have been eliminated. If weeds are well established, a drastic operation such as plowing is necessary. However, when the weeds can be attacked in the seedling stage, a much simpler operation usually proves successful. An established perennial weed is frequently too persistent to be killed with one operation. If this is the case, cut off his food supply. Starve him to death by killing back the food-producing, above-ground parts of the plant.

Apart from special cases, depth of tillage is not particularly important for weed control and because shallow tillage is less costly, it is to be preferred. To kill undesired plants, the time of tillage is usually more important than depth. In the seedling stage, any plant is easily killed. Plants are frequently susceptible to rough treatment at particular periods in their growth. Timely tillage will take advantage of any such period.

Seedbed Preparation

In the preparation of a seedbed, we are always drawing a compromise among a number of opposing factors and it is doubtful if even the seed itself could determine what it wants. It really wants to eat its cake and have it, too. It would like moist soil closely packed around it but it

A FIELD of finely pulverized soil, with all crop residue plowed under, may look mighty pretty and provide a good seed bed, but it is at the mercy of the wind and running water. Dust storms demand an unbelievable ransom from exposed soil.

VERY SOON after primitive man dug the first hole in which to plant a seed he found in the forest he shifted much of the burden of work to the patient ox, but he has only recently learned that there is more to cultivation than scratching a furrow and dropping a seed.

would also like to have necessary air. It would like a loose, open soil through which roots can penetrate readily, but it also wants the moisture which closely packed soil brings it. It would like a warm seedbed, but without the excessive evaporation which warmth brings. Thus, in seedbed preparation, compromise is essential.

While it is difficult to say what a good seedbed is, we know that the seedbed is satisfactory when the seed makes sufficient contact with warm, moist soil to germinate and establish itself without encountering such adverse factors as a surface crust through which it cannot emerge, or a tight layer through which its roots cannot penetrate. The amount of work necessary to establish these conditions depends considerably on the nature of both the seed and the soil. Large seeds will usually establish themselves in a moderately lumpy soil, whereas small seeded crops like the clover must have a well pulverized soil so that the majority of the air spaces are not too much in excess of the size of the seed. Cultivation beyond the minimum required to attain these conditions is wasted effort and may even result in either excessive erosion or crusting of the soil surface.

The amount of cultivation necessary to attain these conditions depends on the nature of the soil. In sandy soils, or fine textured soils in which the particles are grouped together into fine lumps or aggregates, the seedbed is easily prepared. In heavy puddled soil it is difficult to get the large lumps broken down sufficiently without taking advantage of the natural processes of wetting and drying and/or freezing and thawing.

Agronomists agree that the seedbed should be firm. Tillage operations which loosen the soil to depths greater than those at which the seed is planted should be unnecessary for seedbed preparation. Again, shallow cultivation is in order. A few specialized crops like sugar beets and potatoes require a soil which is mellow to a considerable depth in the latter states of their growth to allow normal development. To attain this it is frequently necessary to cultivate to greater depth than is required for other crops.

In seedbed preparation it is frequently important to have the different operations completed in time to allow satisfactory conditions to develop for seeding the crop. Excessive drying is likely to occur following plowing or similar operations and consequently it is necessary that these be completed so that the desired moisture will almost invariably be received previous to seeding. It may "rain equally on the just and the unjust" but the wise take advantage of rain when it comes.

Water Intake

The amount of water that can enter a soil in a given period of time depends upon the size of the openings through which the water enters. Because fine-

textured or clayey soils have a greater amount of "pore space" between particles than coarse-textured soils, they have greater space to store moisture, but the openings are frequently so fine that it takes water a long time to enter and pass through the various layers. In contrast, the coarser textured sandy soils have larger openings through which the water passes more rapidly. It does not always follow, however, that fine-textured soils absorb water slowly and for that reason suffer from excessive run-off. The soil particles frequently exist as moderately stable clusters or aggregates within which pore spaces are small but between which the openings are relatively large. Some fine-textured soils are so well aggregated that they take water about as readily as open, coarse-textured, sandy soils.

During beating rains it is not infrequent to have the soil aggregates broken down after which the fine particles are carried into the openings with the water, clogging them, and more or less waterproofing the soil surface. Because cultivation breaks the soil into lumps with relatively large spaces between them, it has a pronounced effect on the rate at which water can enter such soil.

Once the cultivated layer is saturated with water, the rate of moisture absorbed is determined by the rate at which it can enter the lower layers. Tillage does not influence the rate at which water enters the lower layers except when the surface layer was the one which took water most slowly. The effect of the tillage persists only so long as the large openings remain effective or until the lumps break down.

Air Circulation

The amount of air than can move through the soil is determined by the same factor as the amount of water, by the size of the soil pores. Yet, because the pore space may be occupied by both air and water, it follows that the more water the soil contains, the slower will be the movement of air. Since the pores of fine-textured soils which are not well aggregated become almost completely filled with water, air movement in these soils is very limited when they are wet. Openings that are not more than about one-sixteenth of an inch in diameter will not contribute much to air movement during wet periods. Cultivation seldom appreciably influences the movement of air in layers where pore size has not been influenced.

Air and water movement in the soil are so closely related that it is convenient to discuss together the influence on them of depth and proper timing of tillage. The more open the soil the more readily it takes water, and the greater the depth of this open soil the more water it will take. Thus, deep cultivation increases the amount of water that will be taken in during heavy rains, but so long as the rate of precipitation does not exceed the ability of the soil to take water, the depth of cultivation has no influence.

FOR THREE CENTURIES the soil of America was broken by some variation of the mouldboard plow pulled by horses, humans, mules or oxen in various combinations. It is still the favorite, but it may be the wrong instrument for it won't do a specialized job.

THERE'S NO REASON why a man can't use his head to save his feet. A plank drag with a little extra weight pulverizes the surface for a good seed bed, but watch for wind erosion and quick moisture loss from increased air circulation.

Soils are frequently excessively wet during some season of the year. There is no tillage operation which will satisfactorily combat this condition though on level lands it can be somewhat alleviated through the use of numerous open ditches.

The more open cultivated soil allows a greater exchange of air. Associated with this greater aeration will be greater evaporation. Deep cultivation, by making the soil more open, decreases run-off but increases evaporation. Because the principal advantage of deep tillage is to increase the soil's ability to take water and exchange air, soils that have a high infiltration capacity seldom benefit from deep cultivation. In other soils, it is preferable to have the soil open to a sufficient depth so that excessive run-off does not occur from most rains. It is always desirable to break up a surface crust as soon as possible so that the moisture from succeeding rains can more readily enter the soil. So long as the soil is reasonably resistant to erosion, cultural practices that allow a little run-off from heavy rains accomplish the same purpose as methods that allow the same loss of water through evaporation.

The farmer cannot overlook the fact that he is interested in the economics of the moisture problem and he can only go as far with a particular practice as economic returns will justify. It frequently follows that cultivation to a depth of six to eight inches can be economically justified because of the increased water intake and consequent lowering of the drought hazard. Cultivation to greater depth does not usually bring about increased yields and it is rare that the increase is sufficient to meet the additional cost. Subsoiling seldom pays for its cost even where the subsoil is heavy and compact. Immediately following the operation, drying is likly to be excessive and preparation of a satisfactory seedbed is difficult. After a relatively few rains the subsoil usually runs together again so that the effect does not persist for sufficient time to justify the practice.

The roots of most crops penetrate the soil to a depth of four or more feet. Consequently tillage to any practical depth will influence only a small part of the root zone of plants. So long as adverse factors are absent, increasing the depth of cultivation a few inches could not be expected to have much influence on yield.

Running a plow or other blade implement at the same depth year after year will sometimes cause the formation of a compact layer or plow-pan just below the cultivated layer. When this has happened it is desirable to vary the depth of cultivation enough to break up this dense layer.

Crop Residues

Many farmers almost completely bury crop residues in their tillage operation by plowing them under. This practice has the advantage of getting the residue out of the way of subsequent tillage operations and in a position where it will decompose readily. However, covering the trash leaves the soil surface exposed to the beating action of rain. When the trash is partially worked into the surface or left on top it acts as a deterrent to both wind and water erosion and aids in preventing the formation of a surface crust on the soil. In windy areas it is important to have the crop residue anchored by partial burying to prevent its blowing off the surface. Scientific opinion is at present divided as to the best method to handle crop residues.

Plow Type Implements

To what extent do our cultivating implements meet these objectives? For nearly one hundred years the plow in approximately its present form has been the best known implement and it has been used as a standard for comparison. In completely inverting the soil to the full depth of the operation, weeds and trash are almost completely buried. All but the most persistent weeds are killed. Seeds of the current crop of weeds are usually buried to such a depth that they either do not germinate nor do not establish strong plants. However, seeds from previous crops of weeds are usually brought to a position where they can establish themselves. The operation has a loosening and pulverizing action and consequently leaves the soil in excellent condition to take in water and exchange air. On the other side of the ledger are a number of disadvantages. First, the soil is left in a condition too porous for a satisfactory seedbed, making additional tillage necessary before a crop can be seeded. Then, when the seedbed is finally prepared, the surface is free from trash and exposed to the beating action of rain. It thus is subject to either erosion or surface crusting. Yet, under many conditions, the plow more nearly meets the objectives of tillage than any other single implement. Because of the large volume of soil moved, it is, however, expensive to use, the cost being about double that of listing and one-third more than one-way discing.

The lister is similar in action to the plow, but only one-third to one-half of the surface is inverted and only a similar proportion of the weeds are cut off. While many of the weeds that are not cut off are killed as a result of being buried, rows of weeds are frequently seen in lister ridges. When the implement is used on the contour, a large amount of water can be stored on the surface to enter the soil after the storm. The surface is left in a ridged condition and must be leveled and worked down for crops other than row crops, and this entails additional expense. The limited amount of data available on comparative draft of implements indicate that the cost of listing a piece of land should be about one-half that of plowing, since only half of the soil is moved.

The One-Way Disc

In the large fields of the wheat section, the one-way disc has become a popular implement. The surface soil is all moved to a depth of several inches, but is not completely turned; consequently weeds are completely cut off but only partially buried. In the relatively dry conditions that prevail in the western area, this results in good weed control. The soil is pulverized much more than with the plow, and this implement comes closer to preparing a satisfactory seedbed in one operation than any other implement. The finely pulverized soil does not take water as readily nor allow as free exchange of air as a more cloddy soil. However, a large proportion of the crop residue is only partially buried, so that crusting is less likely than would otherwise be the case. The implement should be used neither when the soil is

CHART SHOWING SEEDBED CHARACTERISTICS FOR CROPS

BY J. C. HIDE

Crop	Moisture Condition	Physical State of Soil	Packing	Depth of Seeding
Corn	Damp	Mod. fine	Firm	1½ - 2½
Wheat	"	"	"	1 - 2
Oats	"	"	"	1½ - 2
Barley	"	"	"	1½ - 2
Rye	"	"	"	1 - 2
Soybeans	"	"	"	1 - 2
Grain sorghums	"	"	"	1 - 1½
Beans	"	"	"	1 - 2
Peas	"	"	"	1 - 2
Potatoes	"	"	"	3 - 4
Flax	Moist*	Fine	Hard	¾ - 1¼
Sugar beets	"	Very fine	"	½ - 1
Alfalfa	"	"	"	½ - 1
Clover	"	"	"	½ - 1
Timothy	"	"	"	½ - 1
Blue grass	"	"	"	½ - 1
Bromegrass	"	"	"	¾ - 1½

* Moisture condition as soon as soil can be worked following a rain.

The mould-board plow has been standard for centuries.

Gang plows may have up to twelve mould-board plows attached.

The blade type leaves the surface intact, baffles wind.

The spring tooth is a shallow cultivator, destroys weeds.

The disc moves earth sideways, leaves some crop residues.

A lister moves one-third the surface. Ridges store water.

A variation of the lister with some blade type virtues.

This "clod buster" kills weeds, makes a good seed bed.

A BASIN LISTER developed to fill the need for an inexpensive method of controlling surface run-off. Dams are at four to eight feet intervals. Below, melting snow has filled the basins with water which is absorbed until the basins are dry, reducing run-off and erosion to a minimum and conserving the water for the dry summer months.

excessively dry nor too frequently between crops because of its pulverizing action. It should be avoided when crop residue is not present because it leaves the soil in a condition susceptible to both wind and water erosion.

The Blade Type

Various sweep or blade type implements have received considerable attention recently. These implements cut under the surface without turning the soil, as a plow without a mould-board. They leave a maximum of crop residue on the surface and reduce the losses from both water and wind erosion. This residue protects the surface from the beating action of the rain and consequently reduces surface crusting and increases infiltration.

In the operation of the blade type implement, if any part of the blade comes to the surface, it will collect trash and cause the implement to clog. To prevent this, the blade is usually run at a depth of four or more inches. Weed control is satisfactory only under ideal conditions or when the operation is both preceded and succeeded by several hot, dry days. The method of tillage is consequently adapted to only the drier areas of the middle west. The use of a rotary hoe behind the blade implement usually aids greatly in weed control by loosening many of the weeds from the soil that otherwise remains on their roots. After the first tillage, the rod weeder can be used for weed control and aids in firming the seedbed. The blade-type of implement has many desirable characteristics, including a lighter draft than the plow. Models so far developed need more careful field adjustment than the above three basic types of tillage implements.

"PLOW DEEP and you shall have to sell and to reap," an adage followed by the farmer who plowed this furrow. The clay subsoil will dilute the topsoil, cause it to pack, and result in little benefit to the crop.

Factors in Crop Cultivation

Row crops should be cultivated primarily as a measure to control weeds and increase the intake of water. Contrary to general belief, formation of a mulch on top of the soil does little to conserve moisture. On soils that have a tendency to crust and become relatively impervious to water, a light cultivation opens them so they are less subject to loss of water through run-off during the next rain.

With regard to new tillage developments, every farmer should remember that many implements which look good in theory have been developed and discarded. It is not advisable to purchase a new type of implement until it has been adequately tried under conditions similar to those where it is to be used. While it should not be assumed that our cultivating implements are perfect, it is probable that the outstanding development in tillage machinery in the near future will be the better adaptation of the present types of implements to tractor use.

SUNDAY CHURCH GOIN' relieves the monotony of a week spent in the hillside corn patch. Families on lonely hill farms put on their Sunday best and meet their neighbors from the next ridge, walking miles to the little church in the dale. The procession grows as it nears the church. A person can store up a heap of words in a week, more than he can spill out on the way to church.

WE GIT ALONG

LIFE IN THE TENNESSEE HILLS

Folks realized how many Tennessee hill people there were when war plants began to pay $1 an hour for common labor. They came running down the mountain in a steady stream to Oak Ridge where the atom bomb was made, to Wright's where the B-29 motors used to roll off the assembly lines, and to a hundred big and little plants around the middle west.

When the war ended, the Tennessee exodus went into reverse and the hill people went back home. Behind them they left a legend. The unkindest part of this legend dealt with a confusion that linked the Tennessee mountaineer with the Kentucky Hill-Billy, the poor white Cracker, and the Tar Heel. City dwellers soon learned to spot the latter by their unkept children, their thin, tawdry clothes, their loping gait and uncomprehending stare. The Tennessee mountaineer is no sniveling poor white. He's pure Anglo-Saxon and very proud of it. His kin folk have lived in the same community for a hundred and fifty years and when the war plants closed he went back home and breathed a sigh of relief.

For back home nothing had changed.

Pa still farms with one mule; Ma helps him in the forenoon and the young'uns take care of each other. The house nestling into the ridge near Cumberland Gap is guiltless of shine and paint. The gate down by the road swings on one hinge and the cross bar won't carry a man's weight. The road to the house is dusty in summer, muddy in spring, icy in winter. A man's work is done by his mule, his woman and himself. The struggle is for existence, and, among the more willful, for self respect.

Where soil is thin and stony, man and beast are long and lean. Tennessee ridge soil is good for pasture, but unless it is rotated, manured and chemically fertilized it finally peters out and won't grow anything but weeds. Up in the hills chemical fertilizer and rotation used to be furriner's talk. Lately Uncle Sam has been doing some tall talking about such things and the hill people are listening.

To back up talk, he built 22 dams in the Tennessee valley with the idea of supplying cheap power and holding back the floods so that silt washed down from the ridges wouldn't be stolen from the valleys. Having produced electricity of undreamed of horse power, the government set to work to free the minds of men before it could free the man from his mule.

A program to educate the hill farmer in modern methods was set up. County agri-

SPOTTED OVER AMERICA are groups of farming people who, because of geography, soil and cultural heritage have developed ways of life vastly different from what we think of as typically American. This is the first of a series of articles exploring the lives of these groups of American farmers.

cultural agents preach of turning the ridges into pasture and getting row crops away from hillside land. Behind this program is tax money from every state, every individual in the Union; the brains of all its scientists, the energy of its engineers. Behind the mountaineer is the stubbornness of ignorance, the unreasoning sinews of superstitution, and the clannish desire to be let alone. Thinking must be changed about cropping, tillage, green manuring, chemical fertilizers. On the ridges pastures must be developed and stock raising and dairying substituted for the old-time general farming.

The Ridge Farmer's Lot Is Hard

But in the steep stoney hills of the back country changes will come but slowly. A man whose father had to shoot his way to and from his corn field is likely to be stern in his judgments. In the struggle to live in the East Tennessee hill country, people have been moulded into flintier individuals than folks to whom life, love and the pursuit of happiness has come more easily.

People are like the land on which they live. The man who wrests his livelihood from Mother Earth must be rugged, resourceful and tireless, and if his land be good, he will prosper.

There is a great variation in the productivity of East Tennessee's soil. Low valley land is unusually fertile and produces a high yield, as much as 125 bushels of corn to the acre. The man who owns one of these valley farms is generally quite well off, and yet his adjoining neighbor whose farm runs high upon the clay ridges is likely to work far harder and be much poorer. His land may produce no more than fifteen bushels of corn per acre, which means that the owner of the ridge farm has to tend more acres of land and still get along with far less total yield. It was one of these ridge farmers who said:

"If a man ain't got him a little White Lightnin' business on the side up here in these ridges he can jist naturally work hisself to death and starve to death while he's doing it."

The ridge farmer may yearn for the fertile valley or rich river-bottom land but seldom does he acquire it, for he finds it hard enough to make both ends meet, let alone to lay aside enough for a down payment on a bottom land farm.

No Introvert, This Mountaineer

The Tennessee mountaineer's great redeeming feature is his sense of humor. He

IT'S PLEASANT to exchange views on the weather and the state of the nation while waiting to get the mule shod at the blacksmith shop. The blacksmith, the most skillful craftsman in the community, repairs everything from a reaper to a coffeepot.

LITTLE TENNESSEE MAN, how now? What will the atom bomb and the asphalt highway and the TVA do for you—and what will you do for them?

WHEN JOE CLARK showed this photograph to the owner of a hill farm he was self-conscious and embarrassed. He had never before noticed, he said, how badly his gate neededrepairs. Now it swings wide and true — on store hinges.

accepts as part of the job tragedies that would floor his city cousin and he can laugh at himself. He's a very sociable sort of a critter who spends what little spare time he has a-chinning with his neighbors. In his small talk, there is a vein of philosophy, humor and understanding of life.

Tales about the Tennessee mountaineer usually revolve around the operation of an illicit still hidden in a gully deep among the hills and battles with revenue agents come to destroy them. There are some stills in the Tennessee hills, but that the mountaineer flaunts the authority of the United States Government just for the hell of it is an injustice. To him the game that abounds in the forests and the corn that grows on the hillsides are for his use. the fruits of his efforts. He reasons that he may make corn pone or mush from his corn as he likes—why should the government object should he distill its juice for his profit and pleasure? He makes White Lightnin' from corn squeezins in his "coffee mill" and regards it as an ethical way to eke out an honest living.

Book laws are not easily enforced in the hills. If they are unpopular they meet with a passive resistance which stumps the enforcement officers. Red points and rationing never did make local sense. If a man had a fat hog and needed meat, he butchered it and that was that. Far more real is a parcel of unwritten laws which are enforced with swift and sure justice. The position of women in the family and community is hedged by a realistic local unwritten code. She is still regarded as a chattel, subject to the desires of her man. The man who borrows another's woman is lucky if he survives the subsequent ambush and it is almost as serious to court an engaged woman as it is to steal a wife. Cuttin's for such violations of propriety are by no means uncommon and the grand jury runs into a stone wall of silence when it attempts to investigate. An informer is roughly handled and an occasional mule thief meets homespun justice in a kangaroo court. Disloyalty is a cardinal offense in the hills.

Folklore abounds, as it does in all isolated communities. Their ballads, some with origins in old England, are sung to the accompaniment of a banjo or a fiddle and tell of gun wars with the revenuers, violent death, and unrequited love. Sung in a minor key, they are filled with sadness and yearning. One of the favorites is "On Top of Old Smoky."

WHETHER YOU GO TO SCHOOL on the back of a bony mule or scoot up hill and down dale with your brothers and sisters, book learnin' doesn't come easy in the Tennessee hills. The rod is not spared in administering the Three R's and there's plenty of home work after supper. Education is solid and fundamental—no cafeterias, but lunch in a tin pail—no easy road to learning, but if you're at the foot of the class your social standing is gone.

THE HIGHER FLIGHTS of learning, abstract science, and the place of the Lake Poets in English literature, are surpluses in the Tennessee hills. But to be able to read and write and figger is a burning desire to be fulfilled by trudging miles in the morning, more miles after school, barefooted over the hill paths. Schools are open only in the winter months, when there is no work in the fields.

MILKING the family cow, tending the kitchen garden, are woman's work and the Tennessee hill girl soon learns how to do these chores. She may wear bobby sox, for she goes to the movies, but she isn't a Bobby Soxer. She marries young and knows hard work is the rule of the hills.

HE WORKS from the time he can walk; he makes a full-time farm hand at fourteen. His wardrobe is a hickory shirt and a pair of blue jeans for week-days, a white shirt and a store suit for Sundays. Juvenile delinquency is rare because there is no idleness. Play-time is short—a possum hunt, a church social, a sorgum boil-off.

A HOUSEWIFE who doesn't feed her brood well loses caste in the Tennessee hills and the next best thing to being a good neighbor is to set a good table. Alchemists of Tennessee wood-burning kitchen stoves transform turnip tops, corn meal, and sow belly into delicacies that stick to the ribs. Tennessee boys make good soldiers—they're tough and they shoot straight.

On Top of Old Smoky

On top of old Smoky,
All covered with snow
I lost my true lov-ver
Come a courtin' too slow.

On top of old Smoky,
I went there to weep
A false hearted lov-ver
Is worse than a thief.

For a thief he will rob you
And take what you ha-ve
But a false hearted lov-ver
Will send you to your grave.

She'll hug you and kiss you
And tell you more lies
Than the cross-ties on a railroad
Or the stars in the skies.

On top of old Smoky,
All covered with snow,
I lost my true lov-ver
Come a courtin' too slow.

He Lives Near the Stars

In adversity man turns to God. The hill people have perhaps had more than their share of adversity and they have learned how to supplement their own rugged efforts with divine help. Sunday church and mid-week prayer meeting are as much a part of life in the Tennessee hills as daily chores. Their attitude toward God is a simple fundamentalism unclouded or uncontaminated by such niceties as questioning a figure of speech. Old Bishop Asbury set the pace for this attitude soon after the Revolutionary War when he rode 225,000 miles through the Great Smoky region, preaching hell's fire and brimstone and the ephemeral nature of man's tenure on earth. Heaven comes very near to the tops of the Tennessee hills and God isn't so far away but that the poorest of ridge runners can talk to Him when the corn crop fails and the young 'uns go hungry.

Church going is often the only social event to break the monotony of the labor of the seasons.

Sunday mornings the mountaineer usually gets to church two or three hours before meetin' time. Lounging in the shade or gathered around the pot bellied stove, according to the weather, he exchanges news, views and philosophy with his neighbors.

Recently at one of these pre-meetin' discussions the topic turned to the origin and nature of man. After several others had explained their interpretation of man, Uncle Henry Welch said that to him man was like the trees of the forest.

"Some trees," he said, "like the dogwood, for instance, never bear fruit. They are put here only to be beautiful. And there are people like that. And there are trees whose chief purpose on earth is to bear fruit and be practical. And there are people like that. And there are trees that grow crooked, scrawny, shapeless and ugly because their seeds were planed in stony ground. These trees can never hope to be either beautiful or practical. And there are people like that. And there are a few trees that are thorny and treacherous and bring only grief and despair to those who

HOUSE AND GARDEN. A little corn for the cornbread, potatoes and turnips and perhaps a row of zinnias. Not much cash money but food for man and beast, a snug cabin, and a jallopy. Design for existence, repeated over and over in the Tennessee hills.

A PENNY SAVED is a penny earned and if you make your own broom you won't have to walk five miles to the grocery. The broom corn was grown in the kitchen garden, the broom stick is a hickory sapling.

A MAN can't git along on a poor ridge farm. He works hisself to death and starves while doing it. He takes his own corn, makes squeezins, biles it off and runs the vapors through the cold waters from a mountain spring. It's honest work from honest corn, and he sees no law breakin' in it, but Uncle Sam takes a different point of view.

come in contact with them. And there are people like that. Then there are the trees of the forest. The noble trees that the poets sing about. The tall straight timber. And there are people like that."

There was a long silence as the folks about pondered these profound thoughts. Finally, Uncle Al Shipley shifted his cud of tobacco, looked off into the faraway distance and said, "Yes, Henry, and just about all the tall, straight timber has been cut out, too."

The mountaineer delights in the all-day singin' with dinner on the ground. Corn huskin's, bean shellin's, apple peelin's and pie and box socials are his fun. And in the fall he loves to gather round the boiling molasses vat and spin yarns or play singing games in the moonlight. And around the glowing hunters' fire he likes to listen to the music of his hounds as they send Mr. Fox scurrying over ridge and dale. And it is here, or at the general store, while the hounds are out of hearing, that he tells the tall tales that he loves so well.

Tales from the Tennessee Woods

Often the tales are of possum huntin'. Well, possum huntin' is really a boy's sport. But any man or boy who has never been possum huntin' has missed a large hunk of the sport that God intended he should suffer and enjoy. Joe Clark, who made the photographs on these pages, writes:

"I'll never forget one night when me and my brother Junebug and Luke Wright all went on a possum hunt. We'd been out hardly two hours before we were headed for home with four beautiful critters and hearts as light as any barefoot boy ever toted, when suddenly our dog treed again, this time in a huge white oak tree. We were just about to pass that one up when we discovered the eyes of a big raccoon peering down at us from the very top of the tree.

"Now a coon is a prize that no possum hunter ever passes up. So we set to work, by turns, at chopping down the tree. One chopping while the other two held the possums.

"After about four hours, when our hands were thoroughly blistered and we were completely exhausted from choppin', the tree started to fall. Just at that instant one of the possums that Junebug was a-holding decided to have itself some fun by climbing up its tail and gnawing on Junebug's hand. And Junebug started yelling bloody blue murder.

"I immediately dropped the two animals I was a-holdin' and rushed to Junebug's rescue. But it seems that Junebug's other possum had caught the spirit of the fray, for just as I arrived he sank his fangs into my thigh. And, instead of helping Junebug get loose from possum number one, I began helping him yell for help.

"As the tree measured its length on the ground the possums decided that they had had enough fun for one night and ambled off into the woods.

"The three of use then rushed down to see what happened to our coon only to learn that he too had escaped. And the tree had fallen on our dog and killed him.

"On the way home the oil burned out of our lantern and we were lost to wander barefoot in a briar field for three hours before finding the house. And the next morning pappy pulled us out of bed and tanned our hides because we forgot to bring home the axe."

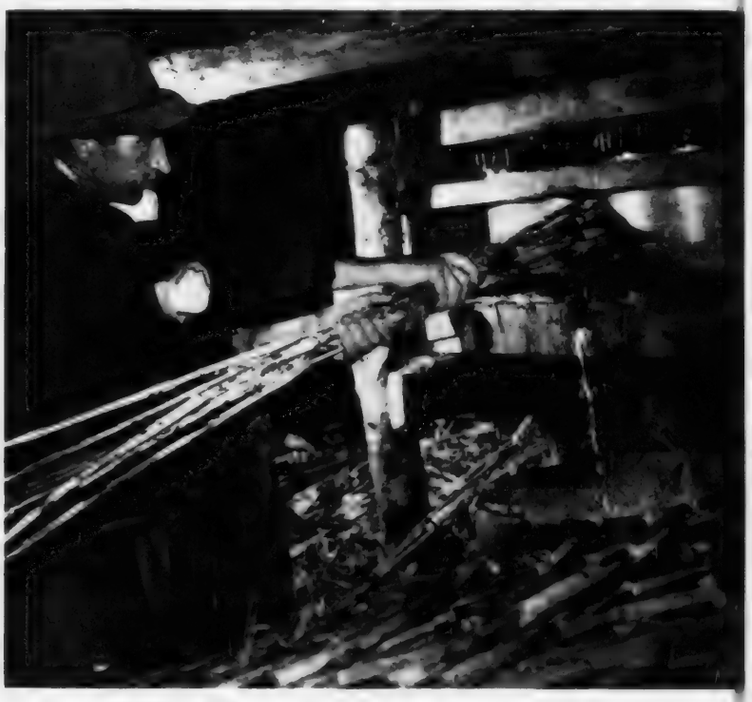
Even As You and I

Those first Tennessee hill people might have been the great grandfathers and

FUN FOR ALL AT A SORGUM BOIL-OFF

The business of making sorgum molasses is often a communal undertaking. The community pools labor to cut the cane, haul it to the press, strain and boil off the juice. Far into the night the steam rises from the boiling juice. Then as the cans of thick syrup are divided and loaded into the wagons for the trip home, the celebrating begins, lasts until dawn.

THE CANE is cut and bundled and hauled to the press.



WHERE the juice is squeezed out and caught in tubs.

Then it is strained and boiled off in shallow pans.

AFTER THAT the fun begins, the singing and the dancing games.

FOR A MOUNTAIN BOY there is no thrill quite equal to a possum hunt on an autumn night. Here are all the trimmings for a moment as rare in the life of a youth as his first kiss—the triumphant hound, the kerosene lantern, the possum caught short and forced to tree in a sapling, the fall moon hanging on the top of Old Smoky. A photograph like this comes only once in a coon's age.

OLD BISHOP ASBURY made the first pattern for a mountain preacher—a stern man, demanding week-day as well as Sunday religion—preaching eternal sin, hell's fire and brimstone, and the power of prayer. Sinner, set yourself welcome.

great grandmothers of the people of Indiana and Illinois and Ohio had their wagons not broken down or their horses perished on the rough Wilderness Trail. Forced to drop out of the procession surging toward the lush and fertile lands of the Ohio and Mississippi valleys, the first hill people built their cabins in the pleasant valleys beyond the Gap. After the choice bottom lands were taken the patches of corn and tobacco crawled up the thin-soiled ridges.

It was those ridge people who set the tradition that man shall earn his bread by the sweat of his brow. Today they know the same thin soil, the hot summers, the bleak winters and the everlasting necessity to work like the devil to make both ends meet. That tradition carries the formula that a man who wears store clothes on week days and smells like he has just come from a barber shop on Saturday night is a slicker of some sort who just can't be worth a lot.

This tradition of the dignity of the calloused palm and the bended back is strong in the Tennessee hills. There is no other way to make a living on those ridges except to work for it and a man who doesn't smell of honest sweat must have come by his living in some dishonest and underhanded way.

That is why the outlander is often not welcomed with the same cordiality which in acorded strangers elsewhere.

What makes these hill people so different from the rest of us? The cultural heritage they receive from their parents, the soil on which they are raised, the lack of luxury, the school house with its simple equipment of birch rod, pencil and paper, the superstitions that are handed down and ingrained in the young, the lack of easy communication with their neighbors, and the communal "oneness" which these things breed make them feel different from "people in the valley" and serve to set the Tennessee mountain man as a creature apart.

But his influence is with us, for he feeds his culture into the mainstream of American life, and we affect him just as he affects us.

The Three R's Were Adequate

A predominantly rural population has little every-day need for the higher flights of education. A farmer does a little

figgerin', he reads the almanac and the newspaper from the county seat and an occasional letter from kinfolk away in the city. The schools in the Tennessee hills, until recent years, were concerned with little more than the three R's and the highest scholastic accomplishment was to be able to spell down the community at winter spellin' bees. School houses were one-room log structures until roads were improved, and buses began hauling the mountain children to modern centralized schools. But even in the old days the primitive educational system produced some good men, men with character whose abilities made up for the lack of refinement in their education. Cordell Hull is from this stock and no one has ever believed that Cordell Hull suffered from any lack of ability or training even in the precious courts of Europe.

The visitor to Cumberland Gap, a center of the mountaineer country, gets there over US Highway 25E and follows the Old Wilderness Road which Daniel Boone was commissioned to cut across the mountains for the benefit of immigrants headed south of Ohio. Claiborne County is in the portion of Tennessee first discovered and settled by white men. Many old time hand hewn log cabins still stand with their chinking still intact.

Occasionally the women plant old-fashioned vegetable gardens with a row of pieplant, horseradish and sage down the middle—flanked on either side by beans, potatoes, yams, corn and onions. Sometimes an ancient picket fence guards the vegetable garden from chickens.

There's a heap of ancient superstition floating around the Tennessee hills, some of it with roots in Anglo-Saxon England.

Some people insist that a cricket's raspin' foretells death. A sneeze before breakfast means visitors are coming. An itching nose means the same thing. If a black cat crosses one's path its spell can be broken by turning around and spitting twice. To roll three times towards the call of the first dove will cure backache. Wearing a match in the hair keeps away headaches. Nose-bleed can be stopped by wearing a piece of lead around the neck. A copper wire around the ankle relieves "rheumatiz". A hog's tooth on a string placed around a child's neck will aid it in teething. If a dead body doesn't get stiff right away, there will be another death in the family. A buckeye or shriveled potato is effective in preventing rheumatism.

"Store" trucks visit farms in some localities twice a month. These trucks, stocked with groceries and medicine, carry their poultry department on the roof. Salt is the storeman's best seller. Manufactured brooms are of little interest to many families who still make their own.

There is practically no urban population in Claiborne County's 445 square miles, and in the past ten years the 24,657 population has grown by only 300. The average farm is 55 acres and of the 3,100 individual farms, non-whites own only 37. Looking over the county at night from a hill-top the soft lgiht of oil lamps shine from 2,900 farms; electric lights from 200. Half the latter have telephones.

The East Tennessee mountaineer is still a man apart from the rest of the nation; stern, lanky and resolute. If you visit him—now that there are roads into the Tennessee Hills—don't make the mistake of treating him like a Hill-Billy. He might surprise you.

A MAN must be beholden to the Lord, so he wears his Sunday best to the church. He sits on hard benches and hears the Word expounded, fair and unadorned. Sermons are two hours long and prayer is a power in the hills.

A BALANCED RATION FOR HOGS

SUPPLEMENTED HOME-GROWN FEED WILL GROW BIGGER HOGS QUICKER

BY HOWARD DAVISON

OLDTIMERS had the hog industry, farrowing, breeding, fattening and marketing, reduced to a simple formula—corn 'em and sell 'em.

Grandpa carried a basketful of corn to the pig pen back of the barn, threw it over the fence, carried the basket back to the corncrib and called his hog chores finished. The corn often landed in the wallow where the hogs dunked for it, getting a good size ration of mud at the same time.

This easy way of feeding hogs was usually profitable in grandfather's day when the hog business was less competitive and the pig pens had not yet become heavily populated with such things as round worms, lung worms, cholera "necro," mange, and the many other parasites and diseases.

Today improved methods of feeding are necessary to make money because your whole profit is tied up in that "extra 25 pounds of top pork"; and a definite program of parasite and disease control brings all the little pigs to market.

Many good hog men of today with hayseed in their hair and manure on their knees can explain the meaning of such terms as riacin, trace minerals, riboflavin and fat soluble vitamins. On the other hand there are many other equally successful hog feeders who would not know a vitamin from a B-29. But these shrewd old fellows, with 20 or 30 years of experience behind them, have what you might call a way with pigs. They can tell from the way a pig attacks his feed whether he will fatten well or will eat his head off. Small bloodshot eyes, a furtive manner, and general scrawniness indicate a pig that will not do well. There is a time when a pig is ready to have the corn poured to him. Experienced hog men know this from the general appearance of the hog and the way he is filling out. And they are very sensitive to ration requirements, increasing and diminishing proportions of range, supplement and grain in just the

right way to get the most out of their feed and animals.

There is contrast in the kind of equipment found on profitable hog farms. Some have all of the latest gadgets: automatic waterers, portable shade, self-feeders, scientifically constructed hog houses and concrete feeding floors which save labor but add to the overhead. Others have the most simple equipment and still get results as long as they follow the simple rules of "Keep them healthy, and keep them well fed."

The interest of the modern hog raiser is a matter of dollars and cents, the maximum per hour return from labor, the maximum per pound of hog flesh gained in return for feed.

A practical interpretation of a balanced ration, by the way, is the amount of feed you allow an animal in one day to give you the greatest cash return. Naturally, the rise and fall in the overall cost of various grain and protein supplements will have a direct bearing upon the ration you feed. The same ration cannot be a balanced one for hogs under all conditions.

The fattening hog requires a ration that will put on maximum gains of flesh at an economical cost; the growing pig requires a ration that will build a framework so that economical gains can be put on at a later period; the brood sow has a special job to do and this requires a little different feed. Because of these differences we should discuss each one separately. And, of course, the best balanced ration for any farmer is made up of the greatest possible quantity of feed that he raises himself.

The Brood Sow

A brood sow during the gestation period (about 112 days of pregnancy) needs proper feed to maintain her own health and weight and in addition develop a litter of pigs. The size and strength of those pigs at birth depends a great deal on the kind of feed the sow received the preceding three months.

The chemical composition of a little pig gives us a pretty good clue as to what the sow needs. On a dry-matter basis we find a little pig is about 70% protein or lean meat, about 20% minerals, which make up the bone in the skeleton, and only about 10% fat. The brood sow ration therefore should contain adequate protein and minerals.

The sow must have enough grain or energy feed to maintain and to increase her own weight. Corn is the most common grain used for this, and while an excellent source of energy it is low in protein (about 9%) and very low in minerals. At college experiment stations, sows fed corn alone usually farrow small, weak pigs. This is what county agents find on farms where pigs have no pasture and are allowed but one grain feed. The addition of minerals free-choice, and about one-half pound of a 40% protein supplement per sow per day will usually correct the trouble.

A PROPERLY BALANCED ration is reflected in the condition of these pigs. Frame and flesh are nicely balanced. Changing conditions in summer pasture may call for a change in the amount of supplement to balance the ration.

In the winter we often run into difficulty with brood sows even though there is added protein and mineral in the ration. The trouble is usually caused by a vitamin deficiency and can almost always be corrected by feeding alfalfa or other good, green, leafy legume hay. Alfalfa hay is a pretty good substitute for the legume pasture we have found so desirable for summer feeding. When cured right, it is high in protein, high in calcium, and high in vitamin A and D. It can be fed in many ways—as long hay, as ground hay in a self feeder, or ground and mixed with the other feed. When it comes to actual rations we find quite a variety in use and most of them good. I have seen excellent results in the summer-time when sows were fed just enough corn on legume pasture to keep them in medium condition. A comparable practice in the winter-time is to feed a limited amount of corn with all of the good green alfalfa hay the sows will eat. Unfortunately sows' appetites for alfalfa vary and some will not eat enough properly to balance the corn.

The safest practice for winter feeding is to include a little more variety and the following ration has given excellent results. The average farmer can raise 89% of this:

50 lbs.	Corn
25 lbs.	Oats, wheat or middlings
14 lbs.	Ground alfalfa
10 lbs.	Protein supplement (40%)
1 lb.	Minerals
100 lbs.	

This ration can be ground and fed either dry or as a slop. It will require about 5 to 6 pounds of the mixture per sow per day although this will vary somewhat with the condition of the sows. Some prefer to feed the corn as ear corn and this ration adapts itself to that way of feeding. The small grain, alfalfa, protein supplement and minerals can be mixed and fed as one feeding a day and four to six ears of corn per sow per day can be fed as the other feeding. Where one man is doing all the work on a small farm this labor saving is necessary.

The question of grinding has been kicked around a great deal. At the experiment stations the grinding of corn has never given enough advantage to pay for the cost of grinding. On the other hand it has always paid to grind wheat, barley and rye. It is much easier to mix ground feed with the minerals and protein supplement and for that reason many hog producers prefer to have everything ground.

Farrowing Time

At farrowing time "balance" is of minor importance. We are much more interested in the comfort of the sow, whether she is constipated, whether the pigs get scours, and whether there is a danger of milk fever. The common practice is to pen the sow and this usually aggravates constipation. Reduce the feed, and replace most of the corn, with something more bulky such as oats or bran.

Do not feed anything for the first day following farrowing, but let the sow have all the water she wants.

If the weather is cold it will pay to warm the water until the chill is off. Start

feeding lightly on the second day and gradually increase so that the sow is not on full feed until the pigs are about 12 days old.

Suckling and Growing Period

After the pigs are about two weeks old they will start nibbling on feed. The same ration can be fed the sows and pigs, and the following one has been used very widely. Here 85% is home grown.

65 lbs. Corn
20 lb. Oats, wheat or middlings
15 lbs. Protein supplement (40%)

100 lbs.

This ration can well be continued until the pigs weigh 100-125 pounds or over, although some feeders prefer gradually to reduce the amount of protein so that there will not be such an abrupt change.

Fattening Period

If the pigs have had adequate protein during the growing period or until they reach 125 pounds in weight, it is not so essential that they have large amounts during the finishing period. The common practice is to put the supplement in a self-feeder and feed all of the corn the pigs will eat.

The corn can be fed as ear corn, it can be shelled and fed in a self-feeder or it can be ground and mixed with the protein supplement. One pound of 40% supplement will usually be enough to balance 10 pounds of corn.

Protein Supplements

Volumes have been written on protein supplements. Hundreds of combinations have been, and are still being tried, both privately and by experiment stations. Arguments wage hot and heavy on whether a complex mixture of proteins is better under all conditions than a single ingredient protein such as tankage or soybean oil meal. Arguments are just about as numerous as to the amount of protein to feed for each age of pigs. The truth of the story is—Mother Nature has a wide adaptability and can partially adjust herself to widely varied conditions.

Taking into consideration our present supplies the following mixture of proteins and minerals will prove quite satisfactory under dry-lot conditions:

20 lbs. Tankage or meat scrap
40 lbs. Soybean oil meal
10 lbs. Linseed oil meal
20 lbs. Ground alfalfa
4 lbs. Pulverized limestone
4 lbs. Steamed bone meal
2 lbs. Iodized salt

100 lbs.

Under dry-lot conditions most experiments agree that a mixture of animal and vegetable proteins gives better results than a supplement composed of all animal or all vegetable proteins. The most common animal proteins are tankage, meat scrap, fish meal and milk products and the most common vegetable proteins are soybean oil meal and linseed oil meal although small quantities of cottonseed oil meal are sometimes used. The proportion of each ingredient can vary with price but it must be remembered that the animal products carry a higher percentage of protein and are worth more per pound.

The percentage of protein in a ration needs to be considerably higher for young pigs than in older hogs. A rule of thumb that is quite accurate is as follows: Feed ½ pound of a 40% protein supplement per pig per day, regardless of age. If your supplement is less than 40% you must feed more than one-half pound and if you are feeding 60% tankage you can reduce it to one-third pound. The older a pig gets the more grain he eats and that reduces the feeding he needs of protein supplement. As an illustration: A small pig eating three pounds of grain and one-half

REPLACE most of the corn in a farrowing sow's ration to prevent constipation. Note fancy ears of pigs, a method of checking cross-breeding results.

THE HOG is a fastidious animal. He doesn't like mud and besides it isn't fattening. Fortunately for hog profits, this type of hog pen is growing rare.

4. Legume pasture seems to have a health factor not found in the test tube. Results of experiments conducted at the Ohio Agricultural Experiment Station show that the number of sick pigs removed from experiment is 10% less when the tests are conducted on pasture.

Substitutes for Corn

Corn is the most commonly used grain in hog production but there are times when it may be necessary to substitute other feeds. You can't "bull-up" the hog feed by simply grinding corn and cob together. Dairymen get by with this, and steer feeders are even feeding extra ground cobs when they can get them, but for hogs corn-cob meal is no better than the corn that is in it, and the added bulk usually slows up the rate of gain.

Wheat generally can be used to replace a part or all of the corn in fattening rations and is worth fully as much per pound. It can be used more advantageously in rations for pigs under 100 pounds in weight. When used to replace from 20-40 percent of the corn fed to growing pigs it is worth nearly 15% more than corn. One disadvantage is that

◄ THE SUPPLEMENTAL concentrate is the key to the balanced ration. The minerals must be bought; some of the proteins come right off your own farm.

pound of protein supplement per day should have the ration mixed, six pounds of grain to one pound supplement. A pig weighing 150 pounds will probably eat six pounds of grain per day and his mixture can be 12 pounds of grain to one pound supplement. To feed more than the required amount would do no harm but on the other hand would do no good. Since the hog is the only domesticated animal which can be fed cafeteria style, he will choose only what is good for him and will instinctively balance his diet if the proper ingredients are before him.

Pasture

There are so many arguments for legume pasture and its winter twin of legume hay that I feel all of us are sold on them. The following points will serve to refresh our memories:

1. Legume pasture will reduce the amount of protein supplement needed by at least one-third.
2. Legume pasture and hay serve as a balancer or equalizer. The need for a complex protein supplement or a complex mineral mixture is greatly reduced. Pigs that weigh over 75 pounds do well on a single ingredient protein, such as soybean oil meal, when they are on good pasture.
3. Pasture greatly simplifies sanitation.

THE FAMILY HOG is often the victim of an unbalanced ration. He'll produce bigger hams in shorter time if the feed is watched.

CROSS-BREEDING has produced quick fattening hogs—also quaint designs. Blacky, left, and Whitey, right, are the parents of Spotty, center.

wheat is low in vitamin A and should only be fed on pasture or when green legume hay is fed. Another disadvantage is that wheat must be ground or it shoots right through the hog and when ground too fine pigs do not like it.

Oats are worth only 60-65 percent as much as corn on a weight basis for fattening hogs. When used to replace 20% of the corn in rations for growing pigs its value jumps up to a place where it is almost equal to corn. It is an excellent feed for brood sows as it helps to prevent constipation.

Barley can replace corn in any ration but because of the fiber coating (which has little food value) it is worth from 5-10 percent less than corn. Like wheat, it must be ground and it is also low in vitamin A. Scabby barley should not be used in large amounts as it is poisonous.

Rye is very similar to wheat but very low in palatability. Should not be used to replace more than 15% of the corn.

Middlings are similar to wheat except they contain more fiber. In fattening rations it is worth about 15% less than corn. Should be used in growing rations or for brood sows.

Hominy is equal to white corn, but should only be used for hogs on pasture or when legume hay is included in the ration. Otherwise the hogs will fall all over themselves like drunken gymnasts. Hominy is

(Continued on page 132)

BALANCED RATION CHART FOR HOGS

BY HOWARD DAVISON

Weight	Age in Months	With Pasture	Without Pasture
Young Pigs After Weaning	2 - 4	65% corn 20% ground wheat 15% protein sup. (40%) 100% (Free feed)	60% corn 20% ground wheat 20% protein sup. (40%) 100% (Free feed)
100 lbs. to 150 lbs.	4 - 5	90% corn 10% protein sup. (40%) 100% (Free feed)	85% corn 15% protein sup. (40%) 100% (Free feed)
150 lbs. to 225 lbs.	5 - 6	92% corn 8% protein sup. (40%) 100% (Free feed)	90% corn 10% sup. (40%) 100% (Free feed)
Sow Carrying Pigs		4-5 lbs. corn and from 1/4-1/3 lb. 40% protein sup. per sow per day.	50 lbs. corn 25 lbs. oats, wheat or midd'gs. 14 lbs. gr. alfalfa 10 lbs. protein sup. (40%) 1 lb. minerals 100 lbs. (Free feed)
Sow With Unweaned Pigs		Feed the same ration as given for young pigs after weaning. (Free feed)	Feed the same ration as given for young pigs after weaning. (Free feed)

Pigs in dry lot should have access to green legume hay in racks or the ration should contain an additional 5-10% ground legume hay. Three per cent minerals should be added to rations for pigs in dry lot and 2% minerals for pigs on pasture, or the mineral mixture can be kept in a shelf feeder so that the pigs can get it free choice. First litter sows should have about 30% more protein than mature sows because their own bodies are growing.

Squabs Are My Specialty

BY JIM ROBINSON

TO A TOURIST a pigeon is a bird that eats out of his hand on St. Mark's Square, but to a farmer he's a nuisance that roosts in his barn and litters up his machinery and his best straw hat. To a squab raiser a "pigeon" is a tough character and whether boiled, stewed, fried, or made into a pie he has about the flavor and consistency of an inner tube; a "squab," on the other hand, caught and broiled just before his pin feathers grow up, is about the last word in gastronomic delight.

Once a rare delicacy for the epicure, the squab now wears overalls and is within the budget limits of the ordinary housewife. When quail and pheasant, early in the century, flew to the protection of the game laws, the squab took a decided turn upward in popularity. Hotels use squabs by the hundred thousand dozen; pre-war passenger ships, plying the seven seas, stocked them by the thousand dozen and they will again as will Pullman diners and the air liners. The demand is increasing with each passing year and the supply does not keep up with it. That's why raising squabs brings no squawks, the reason why it is a profitable business in itself, an insured specialty on any farm or suburban lot.

The founder of the squab industry in America is white-thatched Elmer C. Rice of Melrose, Massachusetts, still vigorously in the same business which he founded in 1900. He has a modern plant in Melrose and ships breeders, all of which he personally selects, to many foreign countries as well as to every state in the Union.

With the permission of Mr. Rice, who incidentally employs two stenographers to answer his pigeon fan mail, we quote from one of 3,000,000 letters which he has received in the past forty odd years. This testimonial will give an indication of the volume of the squab business and the basic profit ingredient, lean supply and steady demand.

"Our 'Chicken in the Rough Syndicate' has restaurant operations in more than two hundred cities throughout the United States. The demand for high class squabs on the regular menus of American restaurants in the United States is increasing. Our company investigated and decided it would be profitable for us to raise our own squabs at our Oklahoma plant." The letter is signed by the manager, I. C. Ownbey.

It would be profitable, to be sure, because it costs very little to raise the squab to market age which takes on the average about twenty-five days.

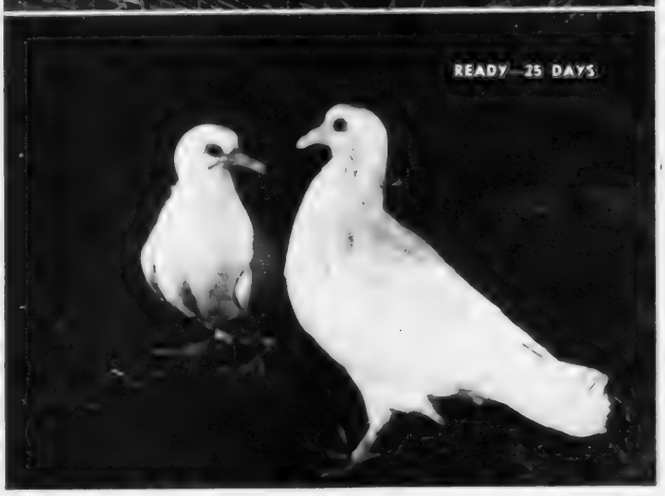
California furnishes most of the squabs for the West. Everything seems to do all right in California, but how about Maine? Squabs can be raised anywhere and will thrive in any climate man can endure. There are successful squab plants in every state.

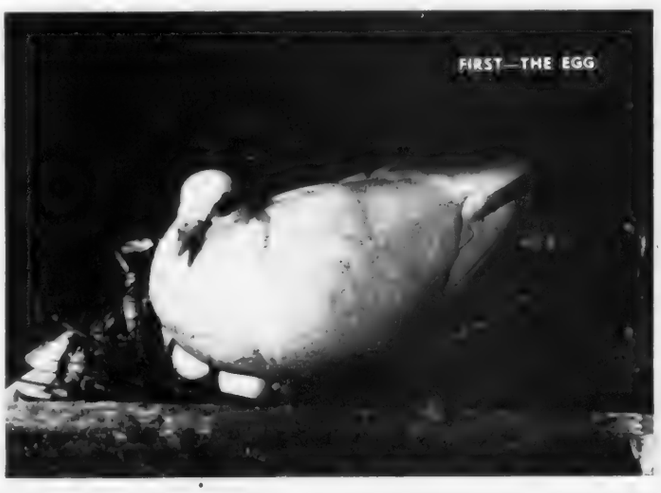
Down in the Lone Star State of Texas, Marcellus Shirley has something to add: "I am getting along well, and have received an offer from the purchasing agent of two large stores here to take all the squabs I could furnish them all the year around at a very nice price. The price is what my retail trade has been paying me for dressed squabs, but these stores offer to take the squabs alive."

These are the beginners talking. When they grow up and expand like Moise and Levi of Sumter, S. C., they will report sales by the thousand dozen. When Harold Moise and Wendell M. Levi returned as veterans from World War I they had not much more than an idea and two pair of pigeons. Today their company, the Palmetto Pigeon Plant, has ten acres of buildings, housing 18,000 birds and producing enough squabs weekly to stock an ocean liner on a 'round the world cruise.

Already veterans of World War II are expressing active interest in the squab business. It is light work and the physically handicapped can make a success of it as well as youngsters and the more advanced in years. Any 'teen age farm boy or girl can handle five or six hundred pairs of squabbing pigeons and do their home work too. The light work and casual hours connected with squab raising are ideal for old people and youngsters. The suburbanite with a large back yard will find he has ample time, after work and on week-ends, to supplement his wages by the sale of squabs and at the same time provide his table with scarce meat. Squabs do not take nearly as much time or space as other poultry. If you have $300 or $400 and a large back yard, you can add up to $600 a year to your income during your spare time; if you have a thousand dollars or two and a country place of from five to ten acres and want to devote all your time to raising squabs, you can do that, and there is nothing except your own initiative and ability to work to prevent you, in time, from making a banker's salary.

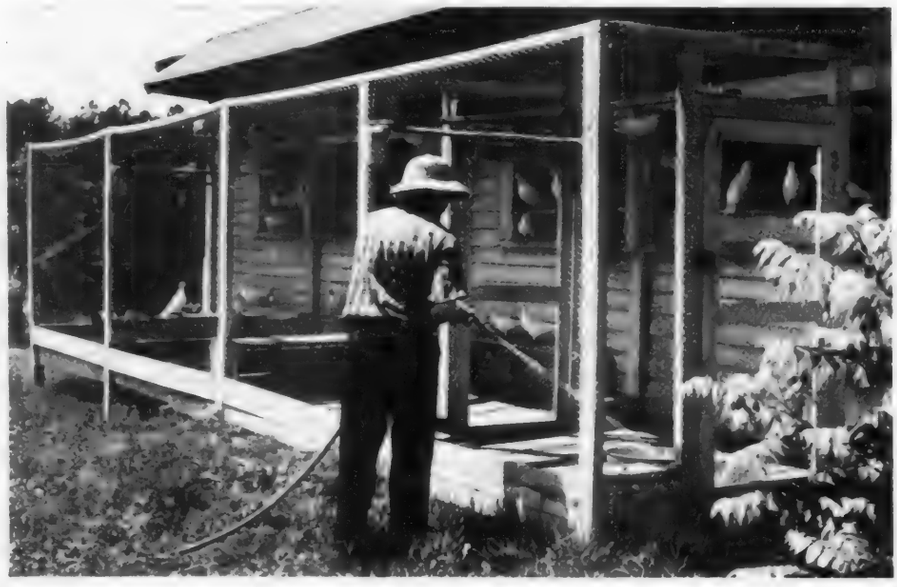
Whether or not you intend to be a large or small operator, the first chore is to learn about the business, from egg to market.





THESE DOUBLE NESTS pull out from the wall like bureau drawers for easy cleaning, and the three-quarter height partitions permit more air circulation than is possible with "pigeon-hole" nests. The "mouse-frustrator" on the leg of the self-feeder is a length of stovepipe. There must be extra nests to prevent quarreling and bloodshed.

AN EASY WAY to fill the bath pan. A pan more than 4 inches deep will invite drownings because pigeons head for a bath the way pigs head for clover. It's every bird for himself—and the last one in is a crow. Bath water should be frequently changed.



Anticipating your questions, we'll tell you first about what you may expect in the way of financial returns, so that you will have no delusions of grandeur; we'll then tell you about the pigeons themselves and then about the plant that you will need; the purchase of breeding stock, the care of the birds, what to feed them, and finally, their preparation for market, will follow.

Investment and Returns

Raising squabs is a business and it pays off as a business if it is run in a business-like way. To start the business with more than one hundred pairs is courting disaster. Until you learn the short cuts and details of care and marketing as well as the habits of pigeons themselves, it is best to operate in a small way. On the other hand, squab raising has poultry raising backed off the map because of low initial investment and labor factors. The Poultry Tribune says an investment of $10,000 is necessary to insure an average income of $1,200 from chickens. This is much higher than is required for squab raising.

One of the reasons why squab raising is a good business is that the demand has

A THRUST through the top of the mouth paralyses the squab's nerve centers and insures complete bleeding. The head is the marketman's best means of determining the bird's real age.

A GOOD PLUCKER can denude a bird in ten minutes or less. Feathers should be washed in cold water and dried with care. Wing and tail feathers go to milliners, the down to pillow makers.

kept ahead of the supply. One may start with a small number of pairs but the sky is the limit. Normally, a squab can be sold for about double what it costs to raise. Squabs are sold by the dozen weight to city dealers. In the East where the demand is great, the retail price at present is about eighty cents per pound and this price is for birds in the regulation market attire; no feathers, but with head, feet, and entrails intact. From egg to eighty cents in twenty-five days is not a bad record for any farm product.

Four thousand dollars a year as gross receipts for one or two hours work a day isn't so bad, is it? That's the amount Mrs. Gastyl Hagedorn, an Ohio woman, received for the squabs she sold the last twelve months. She raises them in a long house in the back yard of her city home.

Nine years ago, Mrs. Hagedorn started in the squab raising business with thirty pigeons. Now she has a large flock used for breeding purposes. From these birds, within the past twelve months, she sold eight thousand squabs at fifty cents a squab. She never catches up with orders, she says. "They are not much trouble . . . I devote a few hours each day to them. Any woman has enough spare time and could raise squabs and do her housework, too."

Pigeons Are Funny

So much for the business end of squab raising. The main interest of making a profit does not detract from the interest in the birds themselves. A pigeon will hover its young at thirty degrees below zero.

GRAIN WILL SPOIL in the squab's crop if not removed before he starts to market. The first step in removing the grain is to distend the bird's gullet by pouring water into its mouth.

TURN HIM upside down, flush him, then wash his feet, for squabs are too busy eating and sleeping during their 25 days in the nest to worry about daintiness. Singe the hairy birds.

The chores of the pigeon family are done on a cooperative basis. Both parents do the feeding until the squabs are of market age. You'll never have to get up in the middle of the night to see if the brooder stove is working. For the first week after hatching, the parent feeds its young a thick creamy mixture known as pigeon's milk. Young pigeon's milk is not taken in the conventional mammalian manner but is regurgitated into the throat of the young pigeons. Gradually, the young are fed whole grains, first soaked soft in the adult's crop, until at the age of three weeks their diet is nearly similar to those of the adults.

In the meantime, when the first squabs are about two weeks old, the missus has laid two more eggs in a second nest and the fun begins all over again. The husband must do some egg-sitting, too. He generally has the swing shift, from 10 AM to 3 PM, although he may punch the time-clock at odd hours, much to the annoyance of his mate who will shake her head and give him the cold eye as he tardily decides he will stay home for a while and help with the chores.

Pigeons are the world's greatest housekeepers. They work at it throughout the year. If they had to make a choice between their two week old squabs and a newly laid egg, they will choose the egg every time. There is a promise in that delicate white shell and their entire effort is concentrated upon bringing out that promise. There is no question in the pigeon's mind about what came first—the bird or the egg. It was the chicken probably that made that one up.

A lot of uninformed people say one pigeon is just like another, but some do have colorful personalities. There are bullies among the males and tender, affectionate females. I had one young hen who either fell in love with me or the old slouch hat I wore. When I entered the pen, she hopped along the top row of nest boxes to follow me around. She kept nodding her head at me and cooing and would hop on my head to be caressed. But she was fickle like all women and forgot all about me when she found a cock that suited her.

I had a cock whom I named Primo Carnera because he was so much larger than the average. He was a terrible bully and once stampeded the cat which sometimes was allowed in the pen to stalk mice. I remember also a courageous, little hen who remained bravely on her eggs while a six-foot snake raided the next nest and swallowed a young squab.

Once paired up, pigeons usually stick to each other for life although one will find an occasional individual who will want to take a look at Reno. The average productive life of a pigeon is five years although there are cases known in which eggs were laid and hatched at twenty years of age.

A good pair of squabbing pigeons should raise each year from thirteen to fifteen squabs to market age. Theoretically, they should raise twenty-four squabs each year, but this never happens because there is a few weeks' layoff during the moulting season and every female should have a month's vacation away from the male. Champions have raised twenty-two a year. One culls stock that produces less than ten squabs a year. It takes on the average of twenty-five days to raise a squab for market. This is from egg to one pound in weight.

Desirable Breeds

There are several breeds of pigeons suitable for squabbing purposes. Among the leaders are the White Kings and the Carneaux. Hungarians and Swiss Mondaines are also kept to some extent by squabmen. All of them grow large, fat squabs if fed right, but most strains of White Kings are more prolific than the others mentioned. However, the Palmetto Pigeon Plant has white Carneaux in the majority and they are a wonderful strain of birds.

Buy the very best stock obtainable to start. Its less expensive in the long run and removes the main cause of failure. A strain of inbred stock will disappoint by slow production and disease will be much more apt to strike a run-down, inbred flock. There is not a more hardy feathered creature than a pigeon if he is cared for properly.

After you purchase the best, start keeping records and try,

THIS TYPE of self-feeder is filled once a week. The cover keeps the birds from fouling the grain. Mice cuss the inverted buckets.

LITTER IS REMOVED with a wide putty knife as squabs are sent to market. If the nest is dry, spray it with disinfectant. If damp from manure, dry it with air-slaked lime, no disinfectant.

PIGEON MANURE can be stacked indefinitely and has no odor when protected from the weather. Florists and vineyard keepers buy it by the sack if you have no special use for it yourself.

SHELLS
REMINGTON
ARMS COMPANY, INC.
FIREARMS
AMMUNITION
BRIDGEPORT

DISOWNED SQUABS are fed on peas that have been soaked in water for 4 hours. A squab with a twisted beak or leg is usually dumped out of the nest to starve. Most large pigeon plants employ full-time hand-feeders. Two feedings of 200 peas each are required daily to fatten for market.

no matter how strongly the temptation is to avoid this uninspiring detail, to keep your records complete and up-to-date for each breeding pair. If you can manage this, you will know what birds to cull and whose offspring to save for your future star boarders.

Good breeders band the legs of the pigeons a few days after hatching. The bands are made of seamless aluminum and are dated; once the bird is grown they cannot be successfully tampered with. Later, when the pigeon has mated, numbered bands of colored celluloid are added. The male is banded on the right leg, the female on the left. This is the best way to distinguish the sexes because the young birds look alike.

We have mentioned Elmer C. Rice of the Plymouth Rock Squab Co., Melrose, Mass. Other typical breeders are the Frank Foy Poultry Farm of Clinton, Iowa, and S. Tokoly, Burgaw, N. C. Many more are listed in the American Pigeon Journal published in Warrenton, Missouri. Care should be exercised to make certain that you are not buying culls or old, worn out birds. Pigeons are no different in respect to pedigree and performance than any other stock on the farm. No one can make a living with scrub stock.

Housing

Pigeons, like most domesticated fowl, respond to good housing. A draft-free building is a pre-requisite although it may be quite unpretentious in appearance. The loft of a barn or other outbuilding can be equipped with slight expense to house squabbing pigeons. With many building materials scarce or unobtainable, revamping available space seems more than logical right now. However, guard against a building which harbors rats beneath it or inside of it. Squabs and rats are not the right combination . . . even the white variety.

Be certain that your pigeon pen or loft is dry. One beginner had his birds housed above the horse stalls in the barn. He had trouble with the eggs which never hatched. It was finally disclosed that the steamy moisture given off by the horses rose to the loft above and made the pigeon eggs nearly impossible to hatch.

If you already have a building which you could use for pigeons and wonder how many pairs it will accommodate, simply line the back and two sides with nests from floor to eye-level height, count the nests and then divide by two. This will give you the approximate number of pairs it will safely hold. However, in practice, it is found that at least ten and as much as twenty percent EXTRA nests are needed to give the birds a choice of nests and to keep down fighting in the squab house. Pigeons will often battle all day long over a nest if there is not enough to go 'round or because they like the view. If, as more than likely, there are eggs in it, they will become broken; if young squabs, they will be trampled.

You may decide to build an entirely new building to house your birds. In such case, it would be well to visit a large, modern plant in your state and see how they do it. Buildings vary with the climate and range from cement block to simple wood frames with but a roof and rolled canvas on three sides.

Only a modest outlay is needed for flypens so that the birds may get out into the sun and have some room to stretch their wings. The squab, which never leaves its nest and therefore never receives the beneficial rays of the sun, draws upon the vigor of its parent which has absorbed the sun's benefits.

Flypens formally were huge affairs, but today they are merely sunporches about six feet deep and high and the width of the pen or building housing the birds. The floor is usually built off the ground two feet or so and may be of boards, spaced slightly apart for rain water to drain or made of wire like the rest of the flypen. Perches are built in the flypen for the birds to rest upon and to sun themselves. Use one inch mesh wire to keep out grain-stealing sparrows and other pests.

Other equipment needed in your squab house is a fountain for change of water each day in winter, twice in summer; some sort of covered receptacle for an all-purpose grit mineral mixture which is mostly ground seashell with a dash of charcoal and salt: and at least two nests for every

SQUABS take such favorable express rates that it pays to locate your best market even though it is miles away. From a low of 25c a pound in 1935, wholesale squab prices ranged upward on the New York market to a high of $1.20 a pound in 1945. Normally high in winter, low in summer, the average range is between 35c to 65c a pound wholesale. New quick-freezing processes will probably eliminate this fluctuation to a large extent. Squabs are shipped a dozen to a box and iced liberally. A well-packed shipment can stand a 3-day express journey, even in summer. Shipments are seldom insured, the premium is too high for the risk involved.

NATHAN SCHWEITZER CO.
509 WEST 16 STREET
NEW YORK, N.Y.

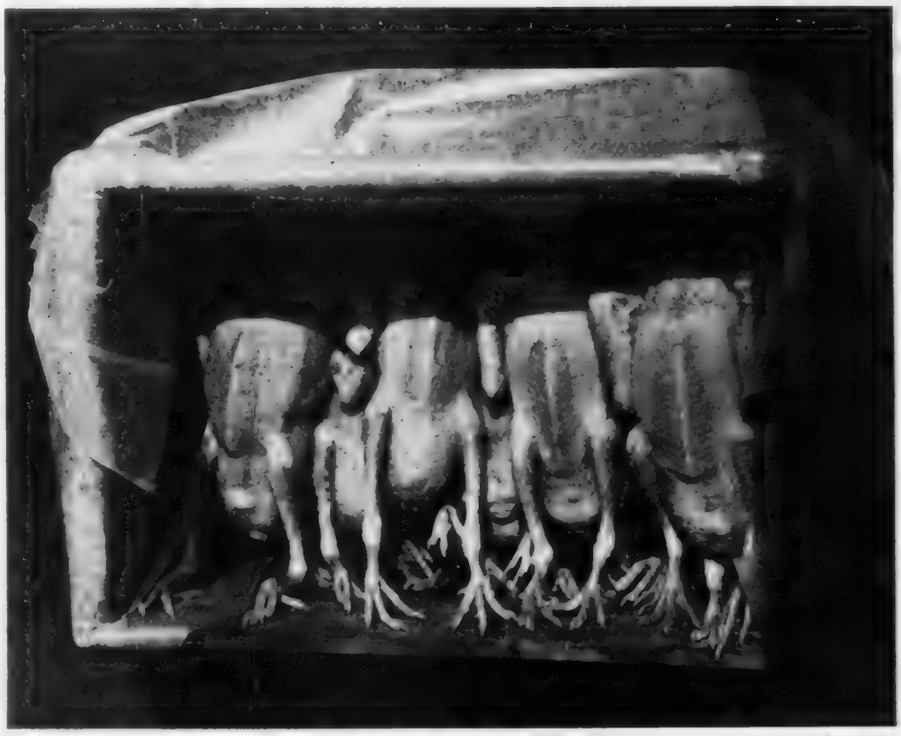
THE FOLLOWING PRICES ARE FOR SQUABS DELIVERED TO OUR DOOR

SQUABS

WE WILL PAY AS FOLLOWS:

12 LBS UP	.96	PER LB
11 "	.96	"
10 "	.96	"
9 "	.96	"
8 "	9[illegible]	"
6-7	JJ	
DARK POOR BIRDS	.45	
Pigeons	.40	

NATHAN SCHWEITZER CO.



breeding pair in the squab house. We will speak of a grain feeder further on.

The pigeon nests should measure a foot in each direction. A three-inch strip across the front of it keeps both the eggs and squabs inside. A six-inch wide board for the parents to alight upon should run the entire length in front of the nests and on a level with the bottom of each tier.

A very good double nest box can be made from an orange crate, but use only the so-called Standard boxes which have a dividing partition; do not use a Bruce box, one which is readily identified as being bound with wire and having no center partition. Most of the Standard orange boxes come from California and are about the only ones obtainable today because of the packaging material shortage. The Bruce boxes are usually knocked down and shipped back to the fruit packing plants. They will do if no other is found but it is quite a chore to remove all the wire and to put in a center partition which forms two, one-foot nests.

Larger squab plants use nests manufactured from lumber. The bottom of each nest slides out for easy cleaning. However, an orange crate can be purchased for ten or fifteen cents which is less than half the cost of a nest made of lumber. A square of cardboard or inexpensive tarpaper (roofing) can be used in the bottom so that when the nest is cleaned, it is an easy matter to remove the entire contents at one time and put in a fresh bottom liner.

A plant housing two thousand breeding pairs will need about 4,400 nests, so the bill for this item can be large. For those who contemplate having from three to five hundred pairs, the orange crate will be found nearly ideal. Just remove all protruding nails and then tack a three-inch strip along the front bottom edge of the box.

There should always be plenty of clean nesting material on hand with which the pigeons may build their nests. Tobacco stems are good and are purchased in bales weighing 150 pounds. The cost is about 2c a pound, delivered. Pine straw is also good and cheaper than anything else. If you live near an evergreen forest or thicket, you can gather your own. Twigs or straw cut into six-inch lengths are frequently used. The container for the nesting material might well be a berry crate with a hinged top. The material then will not become soiled merchandise. The nesting material should be clean. It is astonishing how much of this material they can use, but it will pay cash dividends if you keep a good supply always in the squab house.

Pigeons slow up in their production when they have only bare boards upon which to lay their eggs and to sit for nineteen days while the eggs hatch. Pigeon's eggs require but seventeen days for hatching, but the custom of the hen bird is to lay one egg, then skip a day before laying the second. So it is a nineteen-day process after all. If you like, you can assist them in this nest building. Quite often a handful of new nesting material in a nest will start the pair to work, days faster. Attention to such small details is worth a dollar a week for every pen of thirty pairs.

Feed

Sound, clean grain is a "must" to succeed with pigeons. Examine your grain before you buy it if you doubt the interest of your grain dealer in supplying only first-class, recleaned feed. Some dealers will take whole corn which has germinated and make cracked corn with it. Buying "sorry" corn can easily be avoided by not buying cracked corn at all. The whole grain will keep easier, mold less and absorb less moisture than the cracked grain.

Feed wheat that is old, hard, and sweet; taste it yourself. Peas are less troubled with weevils or mold than the other grains and will make fat squabs. Common, dried, wrinkled peas are fairly plentiful and cheaper than the Canada pea and answer the purpose as well. Kafir corn can be forced upon the birds if other feed is scarce or high priced. Kafir has not the heating value of corn and the birds may eat all they want of it without harmful effect. Too much wheat is weakening. Birds fed entirely with wheat finally get so weak they can not fly off the ground and finally die.

The above four mentioned grains are all that are needed for feeding your squabbing pigeons although one may use millet, milo, buck wheat, field peas, etc., if they are cheaper in price and you wish to substitute them. The usual proportion is roughly thirty-three percent yellow corn, seventeen percent wheat, twenty-five percent peas, and twenty-five percent kafir corn. If these grains are before the birds all the time, free choice, you will find that they will choose them in about this proportion.

Pigeons use a grit and mineral mixture to grind the softened grain and are very fond of it. Each adult pair will consume an average of ten pounds a year. The pigeon's origin, which was along the rock cliffs bordering the various oceans, doubtless accounts for their preference of grit made from ground seashell, although one having a granite or oyster shell base also is used with good results. Because pigeons are confined and unable to pick up their own grinding wheels, it is absolutely necessary to supply adequate grit. It is cheap . . . about 2c a pound delivered. For robust health with your birds, moisten the grit every so often; they will relish it more than if it is bone dry. Buy a good grade from a reliable dealer. Pigeon journals will list dealers.

A Pennsylvania squabman says, "I got along fine until the latter part of last summer when I had the bad luck to lose about twenty or twenty-five of the old birds, which broke up the mated pairs. I lay the loss of my birds to some poor wheat I got from the mill here that must have contained a good deal of ergot*, which caused the females to die . . ."

And now we come to the question of self-feeders versus hand-feeding. Nearly all of the larger, more successful squab plants use what is known as the "cafeteria style" of feeding. This feeder has four or more compartments in which the different grains are placed separately so that they are before the birds constantly, leaving the choice up to them. Fatter squabs will result if the parent birds have access to feed at all times. Pigeons will not gorge like a hog. They always maintain their racy shape.

Hand-feeding means attention three times a day and feeding on special grain boards with a slight lip around the edges to keep the grain from being tossed out on the floor and becoming soiled or wasted. It is our personal opinion that most hand-feeding is done because the flock owner loves to watch his hungry birds fly to him and display their eagerness. They are, indeed, a beautiful sight at dinner time in the loft of the hand-feeder.

To save labor and time, one may make a simple automatic feeder with a bundle of paper covered plaster boards purchased at your local lumber dealer for about 75c for a bundle of five. These "boards" are eighteen inches wide and four feet long. Paint them first to strengthen and preserve the paper and to give them a neat appearance. Two of these "boards" with four-inch partitions between them made of wood or screen wire, make a fine self-feeder. Run the partitions up and down the *width* of the boards. The bottom of the feeder is made to slope so that the grain will feed down inside to the trough you fashion at the bottom. Make a lip along the front edge of the trough to keep the pigeons from wasting the grain. One and one-half inch wooden strips from which porch lattices are made, are fine for this purpose. Feeders of this type may be purchased from dealers.

Set the feeder up on two-foot lengths of regular inch and a quarter water pipe and you will never be bothered by mice eating up your grain and leaving filth in the feeding trough. Mice are clever but they can't shinny a pipe. A feeder of this size will take care of a pen of thirty pair very nicely for three or four days. Place your feeder so it may be refilled with least disturbance to your birds. Be sure you do not make a feeder of some types of fiber boards. Mice will chew holes in it the first night big enough to put your arm through. Everyone has a problem with mice. We are still fondly hoping for a better trap.

If you have running water, an automatic watering system saves much time and labor. Place this fountain out in the flypens. A glance down the line will tell you if they are all in good working order.

Your Government has a bulletin on how

* *Ergot, a black, horn-like fungus, which grows on grain, such as rye and wheat, stored in damp places.*

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THE PAY-OFF
READY TO SELL

TWO PASTURE FACTS that every dirt farmer knows—but has been known to forget: (1) Grass grows green and tall when it is fertilized. (2) Cattle won't eat grass that grows from a dung heap. Dragging the pasture will scatter the heaps, fertilize the pasture evenly, and prevent growth of bitter-tasting grass.

PASTURE IMPROVEMENT

BY MYRON S. HAZEN

A GENERATION ago, when New England farms reached a new low in production and crops on many middle western farms began to decline, a few of the more progressive farmers awakened to the revolutionary idea of making their pastures pay cash money. It was a startling discovery that a pasture, given the same attention and care expended on a corn or wheat field would pay an equally high cash return. The earliest agitation for a sound pasture improvement program started in New England because poverty forced changes in old methods of dealing with the depleted soils. When general farming ceased to pay in that section of the country the farmers turned to dairying or specialized farming. Of course this meant the importation of most of their alfalfa hay and grain. "Why can't we raise the hay on our own farms?" they asked themselves.

In the middle west, as dairying and cattle raising increased, hay and pasturage became scarce and forced attention on pasture improvement. Slow progress attends changes in time-worn methods. Farmers generally, are little conscious of the need of treating their pastures with the same consideration they grant to the fields they set aside for corn, wheat, and oats. A pasture is like friendship in that it will return seven-fold the care and attention bestowed on it.

In seeking improvement, one is likely to be misled in his judgment of his own pasture, for the classification of a pasture as good or bad varies with the season of the year. A poor pasture looks pretty good in the spring. "Grass is the forgiveness of nature" and even on eroded, thin fields early spring brings a renewal of life and a brave struggle on the part of the sparse grass to cover the bare earth. But this green opulence is short lived, for the scant store of plant food in the soil is soon exhausted, the droughts of summer come, and the surface returns to barrenness.

Although the early-season stand of grass may fool the farmer it doesn't fool the digestive tracts of the animal which eats it. Filling as it may be, it lacks nutritive value because the soil from which it sprung lacks the necessary food elements. It is little better than roughage, and the pasture on which it grows is little better than an exercise lot.

On the other hand, a good pasture, ade-

quately limed, properly fertilized and seeded, goes on producing nutritive feed through the dry months, saving the farmer money by eliminating the necessity of supplemental feeding, and keeping his animals in good health and on a high productive level. Such a pasture can produce, either in the form of milk or other livestock products, a cash crop which warrants the same care and attention given to other high value cash crops in any type of successful farming operation.

There are abundant records to prove that with favorable moisture conditions good to excellent pastures will produce per acre from 3000 to 5000 pounds of 3½ per cent milk in addition to furnishing the maintenance requirements of the cows. Good pasture of this sort, without supplemental feeding, can add more pounds of beef per week, stimulate better bone development, and help assure a good calf crop than any other system of feeding.

A good pasture is the original "self-feeder". The cow or steer does its own harvesting and the labor requirements per animal unit on good pasturage are limited to supervision, proper fencing, and adequate fertilization once a year after the pasture is properly established.

Figure out for yourself what it means in these days of labor shortage to have from 120 to as high as 160 grazing days when the "self-harvesting machine" can move the factory into the field and obtain its own raw materials without direct labor expense. The successful dairyman or the producer of meat products, be they milk, beef, mutton, or pork, should not overlook the fact that the surest way to reduce the cost of every quart of milk sold or every pound of meat marketed is to develop excellent mixed pasturage.

Properly handled under average middle west and northeastern conditions, an acre of good land, well limed, amply fertilized, and seeded to the proper assortment of grasses and legumes, should furnish a high producing milk cow or steer the bulk of the feed required from early May until late fall. The seeding mixture must include a sufficient proportion of the drought resistant legumes and grasses to continue growth, at least at a moderate rate, even when moisture is deficient and temperatures high.

No feed mixture can duplicate the increased milk flow which results from ample supplies of nutritious tender grass. More important still will be the marked increase in the percentage of protein. Cattle grazed on well fertilized, improved pastures are also less apt to suffer from mineral deficiencies because of the marked increase in the supply of digestible mineral compounds, especially calcium and phosphorus. The longer grazing period spells a reduction in the need for barn feeding and reduces the cost of production more than any other program.

Now, how should a farmer go about improving his pasture? The land value, the supply of available roughage, the number

PASTURE GRASSES will respond to cultivation as readily as grain and row crops. The money profit from a good pasture equals the return from grain crops

THE TYPICAL PASTURE is a field that stopped paying its way in grain. To bring it out of the red, start from scratch, cultivate deep, fertilize freely.

IF MORE is taken off a field year after year than is put back, in the end it will refuse to yield. To build it back, reverse the process. The first step is plenty of manure and fertilizer, the second is cultivation, the third is clipping to hold back weeds, and the fourth is a selection of grasses to insure both dry and wet season growth.

of animal units maintained, and the market price of the milk or meat products will largely determine the extent of pasture treatment which a farmer can afford to adopt. In areas near the centers of population, particularly during these years when the demand for milk and meat products of every type are far in excess of the supply and the available labor is not only deficient in quantity but also in quality, an intensive pasture improvement program offers profitable possibilities that cannot be over emphasized. Fundamentally, the successful intensive pasture requires the selection of well drained, fertile land that is plowable.

Step One—Fertilizer

The new rapid soil tests enable the farmer to obtain, either through his state agricultural experiment station or from a commercial organization, an approximate inventory of the available native plant food levels which exist in the soil. It should be remembered, however, that an analysis is no better than the sample. Where the land slopes steeply, take separate samples from the upper and lower areas of the field as erosion and leaching tend to move the available supplies of plant food into the lower levels. If there is more than one distinct soil type visible, separate samples should be taken in each area. The soil types will show the so-called pH value, which is an arbitrary yardstick for determining the intensity of the acidity or alkalinity. Seven is neutral on the pH scale and numbers lower than seven indicate increasing acidity or sourness; above seven they show alkalinity or "sweetness". Most pasture grasses and legumes thrive best with a pH value between 6.5 and 7.0. The pH should be considered in conjunction with the supplies of available calcium and magnesium. In most cases a sufficient amount of lime should be applied to raise the pH value close to the neutral point of 7.0 especially where legumes form a large part of the seeding mixture. Complete tests will also show the levels of available phosphoric acid and potash in the native soil as well as the calcium and magnesium. A well trained agronomist, familiar with the soil type and the rotation, can then select the kind and amount of fertilizer necessary to help secure a successful long-time pasture seeding.

Step Two—Divide and Conquer

Where it is possible, larger yields of herbage can be secured by the adoption of a rotational grazing system. Under such a system, the pasture can be divided into three or more paddocks or plots. These need only be separated with a single strand of electric fence.

The life of the system and the total yield will depend largely on four factors. First and most important, the kind and amount of fertilizer applied will make considerable difference in the time when the cattle can be turned out to graze. Typical recommendations provide that on one-third of the acreage a high nitrogen top-dresser with ample supplies of phosphoric acid and potash be applied. No single element will stimulate the growth of grass as heavily as nitrogen, but in order not to draw too heavily on the native fertility, ample amounts of the other major plant foods (phosphoric acid and potash) must be furnished.

On the second plot a potato type of fertilizer is recommended which would carry as much nitrogen as the usual top-dresser. The grasses would, therefore, develop more slowly.

At least five or ten head per acre should be turned on plot No. 1 in order to graze this off closely before the second plot is available. In this way the first paddock will be grazed closely before the second

paddock is ready. In general an average growth of from six to ten inches will give the maximum yield of the most nutritious herbage and still leave sufficient reserve plant foods in the roots to permit quick recovery and regrowth.

The third paddock should be top-dressed the preceding fall with well superphosphated stable manure if this is available. If manure is not available, generous applications of superphosphate and lime, if needed, may be applied or a complete fertilizer low in nitrogen of the grain type. Where manure is applied the preceding fall the grass is apt to be somewhat tainted. If untreated pasturage is available, it is desirable to clip this paddock and either ensile the herbage as grass sil-

age or cure it for "calf hay". This is very nutritious grass and makes an excellent supplemental feed.

Step Three—Cultivate and Clip

When the cattle are moved from one paddock to another, drag over the area with a spreading harrow of some type. The old fashion New England brush harrow, a rim harrow made from old automobile rims fastened together with swivel chains, a chain harrow or even a spring-tooth or a peg-tooth harrow adjusted so as to avoid tearing up the sod will do a fair job of distributing the droppings. When the droppings are evenly distributed they stimulate the regrowth of the grass without causing the development of foul spots which the animals will refuse to eat. Even under intensive rotational grazing programs a certain percentage of course grass or weeds are apt to remain uneaten. The pasture should be clipped at least once and preferably twice every season to prevent the weeds from going to seed. Early June and late September in most areas are ideal times for clipping.

Pasture Improvement Programs

There are thousands of acres of fairly good land where the plant food levels are so low that only the poorest type of herbage will persist. Fundamentally, this extensive pasture improvement program is based on the recognition of the fact that phosphorus and calcium are primarily the limiting factors on most soils. The first essential of such a program is to raise the pH value to at least 6.0, although some soils with a high reserve of available calcium will support desirable pasture plants at a slightly lower pH. Lime is, however, vitally important from the standpoint of its ability to correct the acidity, furnish available calcium as a direct plant food, and increase the calcium content in the herbage. Ultimately this will be utilized by the animals as an important source of digestible calcium. Lime has many supplemental benefits in the soil. It increases the nitrogen fixing capacity of the legumes, makes the native plant foods more quickly available, and improves the physical condition of the soil.

REST, a blanket of manure, and less grazing would revive this sick pasture.

HERE IS WASTE. The thicket and that part of the corn field on the slope should be converted to pasture. The corn field should be planted on the contour.

A GOOD INDEX to the value of a farm is the condition of its pasture. The bare hillside, which might be a profitable pasture, and the shack, are cause and effect.

THE TERRACES in this pasture hold the winter rains and snows, sending the water to the sub-soil as a bank to draw on during the dry months. A good stand of spring grass has started, clipping has eliminated weeds, it is sensibly grazed.

IN SOUTHERN STATES Kudzu grows knee-deep in pastures which formerly wouldn't graze a team of mules. Seedsmen are working to adapt Kudzu to higher latitudes.

Phosphorus ranks first in importance in every pasture improvement program. The initial application, whether it be applied at time of seeding or applied as a top-dressing on established stands, must be sufficiently large to furnish an ample amount of available phosphorus to encourage a vigorous growth of pasture legumes and the better grasses. Practical experience in many states proves that 18 per cent normal superphosphate, which in addition to furnishing over 360 pounds per ton of available phosphoric acid, carries more than double this amount of calcium sulphate, is the cheapest and best source of the needed phosphorus. On most soils from 600 to 1000 pounds per acre of phosphoric acid produce the best results.

The Economical Way

It is more economical and more efficient to make a single heavy application of superphosphate once in three years than to apply small annual applications.

This method of extensive pasture improvement has proven highly profitable in widely separated areas. On the range lands of Florida, on the rocky, unplowable pastures of New England, in certain areas of the middle west, and particularly in New York State where this program has been strongly recommended by the Cornell Agricultural Experiment Station, long-time experiments and practical farm experience have proven the merit of this

MANY WORN-OUT FARMS, converted to grass, are returning a profit equal to that from a good general farm. Pasture rehabilitation may cost as high as $50 an acre; but it's worth it, for each acre will support an animal unit for 160 days a year.

economical efficient use of superphosphate and lime.

There is another advantage in generous applications of lime. By raising the plant food levels and raising the pH values through the application of lime, where necessary, dormant legume seeds germinate almost spontaneously. As the percentage of pasture legumes in the sward increases they are able to fix large amounts of nitrogen from the air sufficient not only to supply their own needs but to furnish a part of the nitrogen required by the grasses.

Frequently it is profitable to combine the extensive treatment with the intensive treatment. As already explained, the application of complete fertilizers high in nitrogen stimulate an earlier growth in the pasture. Even where large acreages are available for grazing a small pasture, topdressed with complete fertilizer to provide extra early grazing, is frequently a desirable investment.

Pastures Worth Improving

For the dairyman on high priced land the selection of the intensive pasture program with its rotational grazing, is a worthwhile investment. To plow, lime, fertilize, fit and properly seed a good pasture may easily cost from $30 to $50 per acre. It should be considered, however, as a long-time investment capable of doubling the yield by lengthening the grazing period and producing lower cost milk or meat over a longer period of years than any other cash crop investment.

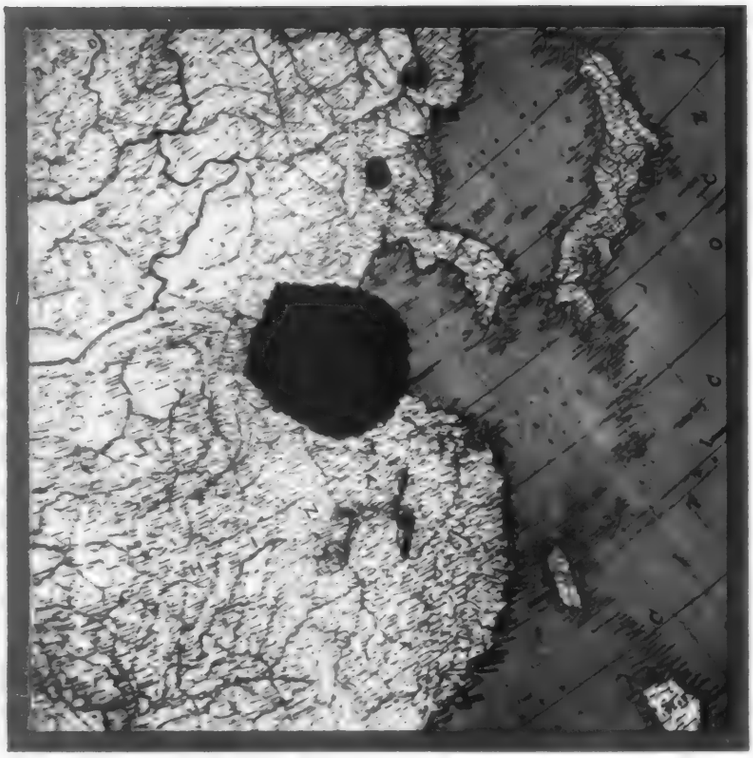
On the other hand, the extensive pasture improvement program offers every livestock farmer with lower land cost an opportunity to ultimately double his yield of digestible nutrients. A total investment of from $12 to $20 every third year, which includes the cost of the superphosphate, lime, and the labor of applying, will give a larger average net profit than an equal amount invested in any other crop. One of the greatest advantages of this program is that it can safely be started at any time during he year, provided the ground is not too soft or the snow too deep. In the northern half of the United States fall applications of lime and superphosphate have given outstanding results. The freezing and thawing of the winter months work the lime and superphosphate into the soil and bring these plant foods within reach of the grass roots when growth starts in the spring. On the other hand, this combination can be applied at any time during the growing season, although it is desirable to tie a few long saplings behind the lime spreader or fertilizer distributor to shake these materials off the foliage and help to bring them in contact with the soil. This exensive program of pasture improvement is a spare time job that will pay big dividends on any sod where there is a fair sprinkling of good native grasses and at least a few legumes present in the sward.

Where no legumes are present and the ground is not too rough, patch seeding may be resorted to. The pasture should be lightly disced or scratched with a springtooth harrow to furnish a partial seed bed. A mixture of adapted grasses with an assortment of legumes, which in the north could include alfalfa, sweet clover, ladino, medium red, and alsike, should be seeded very early in the spring when the surface has thawed slightly but the main body of soil is still frozen. In the south, lespedeza is probably the most important single legume although White Dutch clover and some of the newer varieties have given excellent results.

The success or failure of patch seeding will depend primarily on the amount of seed which can be brought in close contact with the soil and the timeliness of seeding. Dragging over with a brush or chain harrow to force the seed into the freshly turned earth will prevent its lodging on the herbage and increase the percentage of germination. If the land is sufficiently smooth, a roller or cultipacker are more efficient than either type of harrow. Where patch seeding is attempted the lime and superphosphate applications should be applied at least two weeks in ad-

(Continued on page 140)

THE GRASS in the foreground, preferred by five cows, is twice as high because it was fertilized. You'll have to believe us, it's a poor photograph.



The Story

When Dr. Ralph G. Mills mailed a spoonful of Korean Lespedeza seed to a friend, did he dream that in twenty-five years it would cover 40,000,000 acres of American soil?

THEY'LL tell you tall stories about lespedeza. How it found its way to America, how it cures sick fields, how it has saved many a worn out farm and many an undernourished cow. There is something of a miracle and of romance in the way this alien forage crop came to us from the Orient to revolutionize farming in an area as large as the New England states and just about as poor in soil.

The movies have familiarized us with the landscape of the Orient: the procession of treeless hills marching off to the horizons, the mud and bamboo huts of villages set among the clean-washed wastes of valley and slope. A bare land, cultivated intensively for centuries, gleaned generation after generation for the last seed and sprig by a teeming population; a land singularly devoid of the warmth and homely beauty of the American land.

But to Dr. Ralph G. Mills, American, resident medical missionary of the Severence Union General Hospital of Seoul, Korea, this landscape was not unbeautiful, although he often felt a deep nostalgia for the majestic wooded countryside of his native mid-west. In the spring the valleys and hills of Korea were cloaked with a tender green, the green of a plant which Dr. Mills had never before seen.

A naturalist as well as a man of medicine, he saw something miraculous and wonderful in the ability of this plant to cling to the steep slopes, and he marveled at the cheerful and patient way it sucked its nourishment from the thin and aged soil. He saw also that in addition to the invaluable contribution it made to the very existence of the people of Korea as a binder of the fugitive soil of their fields, it was also a crop of opulence for their cattle and hogs.

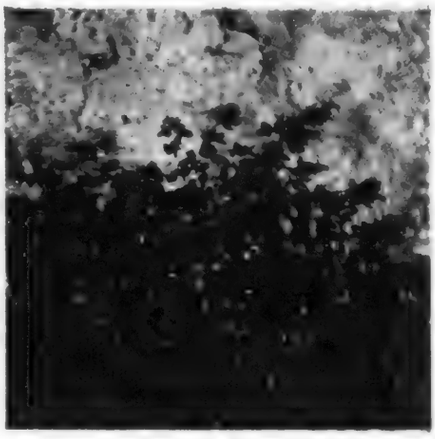
In these things he saw a familiar pattern. He remembered the bare yellow clay of the worn-out fields of his homeland, the eroded gullies, the farms abandoned because the soil had for a century been allowed to disappear down the insatiable currents of brooks and rivers. He saw that perhaps here was a plant which might help reclaim the thinning soil of his native land and at the same time feed the cows and razor-back hogs of Kentucky and Tennessee. This plant is what we now call Korean Lespedeza.

In the fall of 1919 he gathered some of the seed, not much more than what would fill the palm of a child's hand. He sent the seed, without explanation or comment, to the Division of Foreign Plant Introduction of the United States Department of Agriculture. It came to the desk of the late Dr. Adrian J. Pieters, who at that time was in charge of legume investigations for the United States Department of Agriculture. Strange foreign seeds and plants were not new to Dr. Pieters. During his long career at the experiment station he had known a constant procession of them, some of which became staple crops, feeding vast populations, such as the soy bean.

Dr. Pieters planted the teaspoonful of lespedeza. It was sufficient only for a short row in one corner of a field on the Department's experiment farm which at that time was located at Arlington, Virginia. All seeds were, to Dr. Pieters, very much like his own children. He watched the seedlings as they grew and matured during that first season and long before the plant had reached its maximum growth he recognized that here was something with infinite possibilities. With the sixth sense of the scientist he knew that American agriculture had a new and powerful ally from the Orient, with all the virtues of the land of its birth, patience, adaptability, and an infinite utility.

The seed from that first tiny crop was carefully hoarded and the next year small parcels were distributed to a number of experiment stations for further study of its characteristics and range of adaptation.

For years Dr. Pieters had been trying to find a plant that would grow on poor acid soils, a plant that would not only serve to



A PLANT of Oriental refinement, green leaves and stem, delicate pink flowers.

# of Korean Lespedeza

BY ROLAND McKEE

LESPEDEZA can be sown broadcast or drilled with small grain. Once in the ground it responds easily. It covers light or heavy clay quickly, like a cloak.

rehabilitate the land but would also provide a crop. Now, when he was about to throw up the sponge, as if by a miracle came the two teaspoonfuls of lespedeza.

Operators at stations who were making preliminary tests of his first crop of seed without exception sent in enthusiastic reports on the ability of the plant to grow and produce under widely varied conditions. All reported that it grew surprisingly well on poor acid soils where other legumes made little or no growth. It thrived where plantings of alfalfa and clover returned scarcely more than the seed planted.

The plant had the virtue of good seed habits, making it possible to get it quickly into commercial production.

Today, just twenty-five years after the first seed lay on Dr. Pieter's desk wrapped in a piece of Chinese parchment it is estimated that there are over forty million acres in cultivated land and pastures.

THE area in which lespedeza is especially adapted is the eastern United States from Kansas east and from Northern Ohio to Northern Alabama. In the dry Great Plains and to the west of them, climatic conditions are not favorable for lespedeza since it makes its greatest growth in late season when most parts of the western United States are dry. In the extreme northern part of the eastern United States the seasons are too short to permit maturing lespedeza except a few very early maturing varieties, and these make small growth.

Limiting Factors in Planting

The fact that lespedeza grows slowly in spring and early summer and makes rapid growth in midsummer, but does not mature until fall, limits its adaptation to regions with summer rainfall and a long season. Another limiting factor in growing this crop is spring competition of other plants. On soils of good fertility where other plants grow vigorously, lespedeza is crowded out by reason of its slow spring growth. On soils of low fertility where other plants are not well adapted, lespedeza is able to meet the competition, and it is on such lands that it is especially useful. Much of the land in the eastern United States falls into this latter class, which accounts for the large acreage of lespedeza in this region. On dry sandy soils in the extreme southern part of the Coastal Plains area nematode worms do serious damage to lespedeza and limit the value of the crop. But little damage from nematodes has been noted in heavy and damp soils and under such conditions the crop can be used to advantage.

How to Sow and Prepare Soil

For those not already familiar with lespedeza it should be stated that the crop in general is similar to clover or alfalfa. The plants have leaves with three leaflets, and usually attain a height of from 10 to 20 inches. While the plants branch freely and are quite spreading when grown singly, in thick stands they are upright and branch but little. The crop is always grown in thick stands sown broadcast, or in close drills, making a complete ground cover. In waste places it also makes a matted growth and volunteers from year to year. It is thus easy to visualize the part this crop is playing today in the control of erosion in the eastern United States, a region of highly erodable soils. It serves in cultivated fields, in pastures, on roadsides, and in waste lands wherever seed has once rooted. A bushel of seed will sow two and one-half acres at the rate of 20 pounds per acre.

On cultivated land it fits well into rotations with small grain, which makes it possible to keep a year round ground cover. The lespedeza is seeded into the small grain

COMPARATIVE YIELDS, PRICES, ACREAGE AND CRUDE PROTEIN CONTENT OF LEGUME CROPS

Legume	Hay Average per Acre Yield	Protein Per Cent	Estimated Acreage U. S.	Yield of Seed per Acre	Farm Price Ton of Loose Hay	Price per Bu. of Seed
Korean Lespedeza	Pounds 1,941	14.1	42,000,000	Bu. 4.91	$14.95	$ 4.00
Red Clover	3,200	14.2	12,280,000	0.89	$16.50	$18.04
Alfalfa	4,333	15.5	15,701,300	1.55	$17.50	$20.22
Alsike	2,000	14.6	3,800,000	2.29	$14.95	$16.15
Soy Bean	2,378	12.2	16,064,000	18.1	$14.00	$ 1.83
Timothy	1,800	6.7	6,139,000	3.90	$13.50	$ 2.39
Timothy and Clover	2,826	8.5	20,621,000	2.1	$15.30	Varies, based on per cent

Information from "U. S. Agricultural Statistics 1944" (crop 1943), State Agricultural Experiment Station and Department of Agriculture publications, and other sources. These figures are approximate in all cases since wide variations are found under different soil and climate conditions. Timothy and clover seed are rarely harvested together. Red clover outyields alsike and both will usually outyield timothy. Protein is for dry hay. Prices quoted are the average prices paid to farmers for the 1943 crop and are not to be confused with retail prices.

THE ACREAGE of Korean Lespedeza more than doubles its nearest competitor among hay crops. Its popularity springs from its prolific reseeding habits, the vigor with which it attacks the erosion problem and the way it makes itself at home on poor soils.

COME LATE SUMMER and early fall, when all other pasture grasses get discouraged, thin out and turn brown, Korean Lespedeza hits its stride. In spring it is handicapped by faster growing neighbors but it accepts thin soil as a challenge and once established can hold its own in any company. One acre will carry one animal unit the entire season.

and becomes established before the grain is harvested. After harvest it continues to develop and affords a ground cover until fall, while at the same time it supplies pasturage or a hay or seed crop.

When sowed by itself on land previously cropped prepare the soil by shallow discing.

One of a long list of prominent farmers who have helped convert doubters to the advantages of Korean is Chas. H. Mecham, Jr., of Morganfield, Kentucky. His first crop of seed from a thirty-acre field sold for enough money to purchase 107 acres of good Kentucky farm land adjoining his farm. He has been a leading figure in seed production and distribution for many years. During the drought of 1934 he and his neighbors helped save many diary herds in Wisconsin by selling Korean hay to the drought districts. He held a Korean meeting on his farm in 1933 attended by 1500 people from seven states.

LESPEDEZA is an easy crop to grow. The seed germinates readily and at a time of year when ample moisture usually is available. The usual recommended rate of seeding is 20 to 30 pounds per acre. In the latitude of Washington, D. C., seedings are usually made in April. Farther south, seedings are made in February and March. In the extreme north, seedings should be delayed until early May. When once established lespedeza can, with proper management, be volunteered from year to year. This practice is followed especially in Missouri where small grain and lespedeza in rotation has been combined with livestock to give us a system of farming that helps in controlling erosion, and forms the basis of a profitable agriculture. The Missouri Agricultural Experiment Station has sponsored this type of farming, and Dr. W. C. Etheridge, agronomist of the station, has been its strong advocate. Lespedeza being a legume, adds nitrogen to the soil, and this together with the fact that it will grow on poor soils, should not allow one to conclude that fertilizers cannot be used on the crop to advantage. When crops are removed from land, plant nutrients likewise are being removed from the soil and to maintain fertility, the crop, or at least a good part of it, must be returned to the soil, or fertilizer applied in place of the crop residue. Soils of high fertility not only give larger yields of hay and pasturage, but also produce higher quality feed. Plants grown on mineral deficient soils will be low in minerals, and consequently produce feed of low quality. In order to insure feed with ample mineral and vitamin content, it must be grown on soil of good fertility and be handled and stored under favorable conditions.

WHEN SOWN by itself on land previously cropped, the soil should be prepared by discing or given a vigorous shake-up with a harrow. When cut for hay it should be in first bloom, for then it enjoys the highest protein content. It cures quicker than clover or alfalfa, but is harvested and handled the same way.

Which Fertilizer to Use

Superphosphate is the fertilizer most needed by lespedeza, but in some places the use of potash has also given good results. Lime, which is usually recognized as a soil amendment rather than plant food, gives good results on more acid soils, and even on less acid soils small amounts in combination with superphosphate usually will be found beneficial.

As a hay crop lespedeza is considered nearly the equal of alfalfa. In feeding tests it has not given quite as good results as alfalfa, but this may be accounted for by the fact that until recently most lespedeza has been cut at too mature a stage to make hay of best quality. Cutting lespedeza at a somewhat mature stage gives larger yields, but this results in low quality hay and may interfere seriously with volunteering a crop. Cutting at first bloom or before makes it possible to produce first quality hay, and allows sufficient time to mature enough seed to insure a volunteer stand the following season.

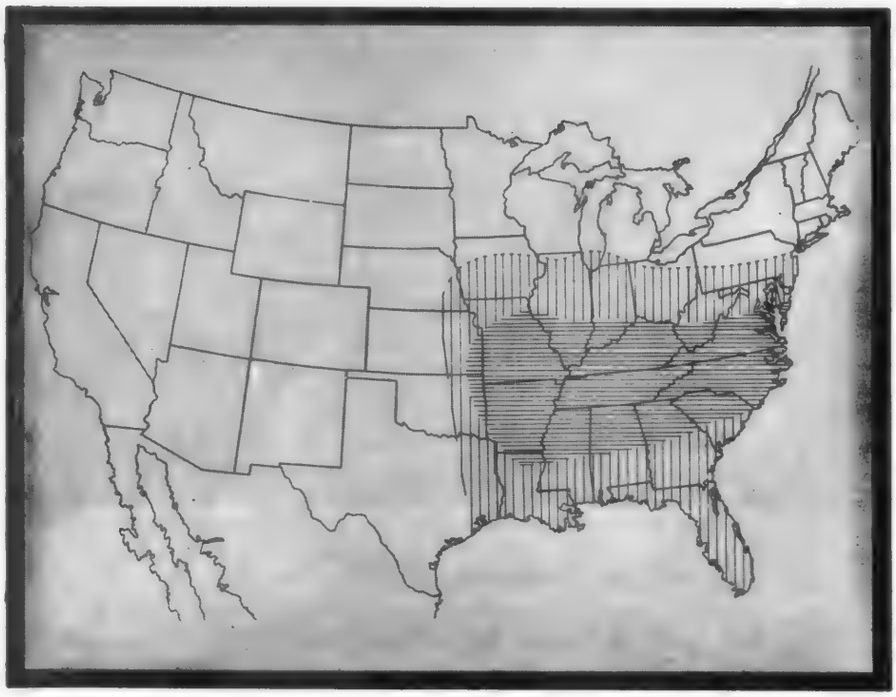
In feeding value lespedeza pasturage is considered the equal of pasturage from other legumes. In time of availability, however, it is of superior value since it affords pasturage in late summer and fall when other pasture plants are making little or no growth, or are of low quality. It is this feature of lespedeza that makes small grain-lespedeza-livestock farming possible and is a major reason for its popularity. Lespedeza is relished by all classes of livestock and when grazed or fed alone, or in mixture with other forage, satisfactory gains have always been attained. The carrying capacity of lespedeza pastures of course varies, but under average good conditions an acre will carry one animal unit for the season. In the latitude of Maryland and Missouri lespedeza affords grazing from early June until fall, and late maturing varieties continue to grow until frost. On cultivated land lespedeza is grown both alone and in mixture. In permanent pastures it is always in mixture with grass.

Bringing in the Harvest

Lespedeza for hay or seed is harvested and handled like red clover and similar crops. The hay crop cures more quickly than clover or alfalfa and in this respect is superior to those crops. This quality in lespedeza is especially valuable since in the region to which it is adapted high atmospheric humidity and heavy rainfall makes curing of all hays difficult. In bright warm weather hay from light stands of lespedeza

If planted with small grain, Lespedeza will establish itself before the grain is harvested, supply pasture until late fall, and at the same time act as ground cover for erosion control during winter and spring rains. In the latitude of Washington, D. C., late April and early May are the best times for planting.

WHAT LESPEDEZA has done for the bare and treeless soils of China it is doing for the worn-out fields and hillsides of Kentucky and Tennessee. It heals the scars of erosion, traps nitrogen, can feed an animal an acre.



THE HORIZONTAL lines show where Lespedeza is extensively grown. The VERTICAL lines show where it can be grown.

cut in the morning can be put in the barn the same day it is cut. As a rule, however, cutting should be done one day, and putting in the barn or stacking delayed until the day following. Yields of hay range from one to three tons per acre. Yields, however, are largely dependent on relative soil fertility. As a seed crop, so far as production is concerned, lespedeza is superior to clover and alfalfa. It seeds regularly and abundantly, and is not difficult to harvest. Seed yields in Korean lespedeza average about 400 pounds per acre, while twice that amount or more is possible. The crop can be allowed to come to full maturity without loss of seed, and then harvested with a combine. On small farms the seed crop is usually cut with an ordinary mower with swather attachment, and threshed with a stationary thresher. Sometimes, in cutting the crop, a seed-pan is attached to

THIS IS SERECA, one of a large number of varieties of Lespedezi. It has woody stems and is not quite as palatable as Korean but is a marvelous soil builder. These plants were grown under controlled conditions on an experimental farm.

THE VERY FIRST CROP of Korean Lespedeza in the United States. These plants were grown from the spoonful of seed sent to America twenty-five years ago by Dr. Mills.

the cutter bar of the mower to catch shattering seed. This helps in attaining maximum yields which is especially desirable when the seed crop is short, or when one wishes to increase seed of new and improved varieties. Lespedeza seed does not retain its viability as long as the seed of many other crops, but if harvested when fully mature and stored under favorable conditions, it can be kept into the second year with but little loss in viability. Older seed and seed stored under unfavorable conditions will usually give low germination. To insure stands it is advisable, therefore, to use seed of the current season's crop. An even safer procedure is to test seed each year before seeding.

The romantic origins of lespedeza, its expanding cultivation, and its great promise lead naturally to the question, "What of its future?" If we can judge by its record since its introduction, its popularity will grow, acreage will increase in those sections in which it has already adapted itself, and improved varieties will be developed for other sections where it is not now grown. In its role as an erosion control, as a reclamation agent, and as an adjunct to livestock—grain farming, it will do for large sections of America what it has done for China.

BARNS ARE SYMBOLS

THE biggest, best and most expensive thing on the American farm is the barn. American farmers do think first of their barns. They stand as a symbol of the productiveness of the farm, the thrift and skill of the owner, and the pride he takes in his vocation. The wise farmer, and all farmers are wise in unexpected and subtle ways, knows that his own welfare rests on the care he gives to his stock and crops and he wisely places first things first and provides snug, comfortable quarters for his animals, and dry, secure bins and lofts for his crops. The comfort of himself and his family will follow as a matter of course.

If he doesn't love animals and the fruits of his labors he isn't a farmer, so for this reason he could not be comfortable in the family featherbed on a cold winter night if he knew his cows and his horses were shivering in drafty stalls and that the snow was sifting into his wheat bins.

He builds big barns, barns well-painted, with cupolas, romanesque windows, and a weather vane with an arrow or a rooster pointing in the direction of the winds. When he builds his home he draws a rough sketch for the carpenter, but he sharpens his stub of a pencil and sits up all night expressing himself in the design of his barn. He wants it just right.

The American barn is America's only contribution to original architecture. (Our fabled log cabin is a Finnish export.) The American barn is truly American, not to be duplicated anywhere. It grew on American soil, out of the peculiar needs of American argriculture. The barns of France and England and Germany were designed to protect a team of horses, a cow or two, and wheat from the

THIS ANCIENT BARN was built by an early settler. The shingles were split by hand and laid in the dark of the moon to prevent warping. Stalls are on the left. The open part can be used for hay storage or as a wagon shed.

SNOW will not accumulate on the roof of this barn. The idea came from Scandanavia.

THE ROUND BARN is perfect for the storage of grain and hay and is more resistant to high winds than are angular structures. A disadvantage is that divisions for stalls and machinery storage often leave unusable odd corners.

GRAIN is easily scooped from the bins and cribs built into the sides and center of this barn.

The circular barn permits the efficient use of space for hay and grain storage. Its huge mow will store an amazing tonnage of hay and the ground level provides ample space for stock shelter. Construction does present a tough engineering problem, for if material is not of the best and the design right the whole structure will be endangered. The cost comes high.

THE LAST SHOTS of the Revolution echoed from the stone walls of this Pennsylvania Dutch barn. Its seasoned oak timbers are as hard as flint and its walls and foundations good for another century or two. The neat barnyard is typical.

miniature farms of the continent.

Like our country, American barns were large from the very beginning. Corn, which might stand as a symbol of American economy, requires space. Great fields, each larger than the average continental farm, demand great bins and spacious mows for wheat and hay. Herds of cattle and droves of hogs which consume the corn and the hay need shelter from the rigorous American winters. We have big barns on big farms in a big country.

They say the pioneer built his barn first, lived in it until he could find time to build a home. As he prospered, his barn grew in size, but his family got along somehow in the old log cabin, even to the second generation. The first paint brought to the farm went on the barn; the family cow got fresh straw every day, but the family slept from one year's end to the next on the same husk mattress.

While barn design is America's unique contribution to architectural art, design is by no means uniform. Highly utilitarian as well as decorative, the design varies as the requirements vary with different sections, different crops. Design also reflects the peculiar temperament of the people of a section. In Pennsylvania, for example, the solid, thrifty German settlers built barns for eternity. They had no faith in the ephemeral qualities of wood; they were there to stay and their barns, there to stay also, were built of stone.

In the middle west, where oak and ash and hickory abounded, beams and rafters were hewn from the trees cleared from the land. They were not as everlasting as the barns of Pennsylvania, for always there was in the mind of the pioneer of the middle west the notion that there were greener fields farther west; his barn need not be so permanent.

The interior design of American barns follow a set pattern — stalls for the horses, a granary, a pen for cows and storage space for machinery on the first floor; a hay loft on the spacious second level. It was on the exterior that the designer gave expression to his artistic imagination. The farmer's wife expressed herself in a quilt—the farmer in his barn.

Barns have a nostalgic attraction for American men. Many a man, remembering his youth on a farm, dreams of the heavenly snoozes he stole in the fragrant hay in the mow on a rainy day. Sgt. Bill Mauldin tells us that doughfaces, seeking billets after harassing days in the foxholes, sought out barns. In *"Up Front"*, Sgt. Mauldin says: "But when the guys are really lucky they find a barn, and every doggie knows that barns are far better than houses. He avoids houses and questionable mattresses if he can find a luxurious barn full of hay."

There is no doubt about it; there is more to barns than stone and timber. They are symbols.

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HOW TO BUY A WORK HORSE

FOR ways that are dark, and for tricks that are vain, Bret Harte's heathen Chinee has nothing on the traditional horse trader. Although a vanishing race he has left behind him a legacy of tricks to trap the unwary buyer who often learns so much too late. The prospective buyer who knows nothing about horses and the practices of the professional horse trader had better buy through a third party or deal only with reputable dealers. The wiser the purchaser, the higher hangs the peg of things the dealer "never would do to sell a horse."

Perhaps, you need a horse, and a neighbor whom you regard as the soul of honesty, offers to sell you one. He makes no claims for the animal. "There is the horse," he tells you. "My price is $200."

At this point the diligent horse buyer goes into a routine, following a definite method of procedure in examining the horse for his good points as well as for his faults.

First of all, the horse should be examined in the stable, preferably in the stall he habitually occupies. There you will discover whether or not he is addicted to any of the so-called stable vices. These vices and their identification are as follows:

Halter pulling—Horses wearing extra heavy halters, particularly heavy rope halters, or a rope around the neck, would be suspected of halter pulling. Likewise a rope or chain tied from one partition to the other at about the height of the quarters, or the use of what is known as the body rope, may indicate this vice.

Cribbing and wind sucking—Horses that suck in air through the mouth, accompanied by a grunting sound, are termed wind suckers. Cribbers press their teeth on some object, such as the manger, while sucking in air; consequently the characteristic wear on the teeth may indicate this vice. A broad strap buckled snugly around the neck at the throat-latch is also used as a preventive. Horses with these habits fill their stomach and intestines with air, bloatng the abdomen. They are hard to keep in good condition and are somewhat subject to colic.

Kicking—Heavy chains suspended from the ceiling close to a horse's hind legs, the use of chain hobbles, scars on the hind legs, and shoe prints on the partitions, are evidences of stall kicking, a bad vice.

Stall walkng and stall trotting—Energy-consuming vices which indicate a restless, nervous temperament may be identified by well-beaten paths around borders of his box stall, while the latter vice (indulged in by horses tied in their stalls) manifests itself in a trotting motion of the feet. Stall trotting is not as common as stall walking.

Weaving—Weavers throw their heads and forequarters from one side to the other and are objectionable because they use up energy. They frequently stand wide on their forefeet.

There are other minor stable vices which may be identified by an examination of the stall. These include rubbing the mane and tail, chewing the manger, and biting and lunging when approached. Horses at times seem to have a diabolical sense of humor. They seem to know ex-

actly where to plant a steel-shod foot on your favorite corn, or precisely when your face is within range of a heavy tail. Occasionally a mild appearing horse is an ornery, obstinate devil at heart. In the story of David Harum, you will recall, a gentle-eyed horse was sold with the assurance that he was "as safe for a woman as he was for a man." The catch was that he was safe for neither.

It is said that if a sound camel were judged by the point system his total would be zero. Yet the camel is a good draft animal, has reasonable speed, and is easy to keep. So do not be frightened if your horse does not total high. If he can do the job expected of him, he is worth buying.

YOU have now examined the horse in the stable, watching out for the telltale signs. The animal should next be led out so that he may be inspected in a good light and on a level and solid footing. Normal health is indicated by an alert, graceful carriage, rich lustrous coat, and good conditions as to flesh. If backed out of a single stall, look closely for extreme flection of the hind legs, which is known as string halt.

If you are buying a draft horse, the heavier the better. Other things being equal, size is at a premium for any purpose. Undersize horses seldom bring top prices. The height of a horse is measured from top of the withers to the ground, the distance being expressed in hands. A hand is four inches and a good sized horse will measure fifteen to sixteen hands.

The temperament of a horse indicates his disposition and nerve force. For instance, a nervous, excitable horse (which shows lack of a strong nervous system) is hard to control under many circumstances, while the sluggish, phlegmatic animal, though docile, lacks ambition and endurance. Desirable temperament is indicated by large, mild bright eyes; a good width between the eyes and behind the ears; forehead neither too concave nor convex; willing obedience to commands and an alert, active, graceful carriage. Temperament and disposition are influenced by training and handling so it is well to keep these factors in mind when testing a horse at work. Horses, like people, have definite personalities and no two are alike. A horse may be perfect physically and yet be totally unfitted for the job at hand.

Quality is an intangible factor which comes from good breeding. It is indicated by texture of skin and hair, general contour of the horse and the cleanness of his features. It is well known that often the smaller bones from a well bred horse show more strength than the larger but coarser bones from a heavy, ill-bred one.

For immediate, hard service a horse should not be younger than five years. His value begins to depreciate when he is eight years old, but he may be useful with good care until he is over twenty.

What can equal the ponderous dignity and beauty of a team of horses plodding down a furrow on an early spring day. The gleaming share cuts into the dark rich earth; on tree and hedge and field appear the tender and delicate green of bud and leaf and spring grass; the ploughman in his red jacket with bent head watches the mould as it turns and breaks; and over all rests the fickle blue sky of April. One hears the ploughman sing behind his team, sees him smile. The tractor is a hard master, a thing of the factory and the city. A horse seems somehow a part of the land, one with his surroundings, enjoying its blessings and its productiveness.

YEARS ago the author stood looking at an old roan mare that had been brought to an auction for disposal, at any price. The horse obviously had known better times. It was clear that it would be disposed of as a "killer", for the meat on its ancient bones. There was something poignant in this sight, a faithful old horse turned grey in the service of man and the soil, now of no use except for the meat and tallow her body would afford. A

trader, also up in years and perhaps drawing an analogy, remarked: "I'm going to buy that horse. He's got plenty of work left in him yet if he's properly cared for." The author would wager that that old roan mare died a natural death, years later in the trader's pasture.

Teeth indicate the age of a horse, but if he is under three or over eight this method of determining age is not too accurate. Beware of a horse whose teeth are short and tend to form a triangle where the incisors meet. He is probably too old for good service.

The head should be well-proportioned and clean-cut and should be not too concave nor too convex between the eyes, the former often favoring a timid disposition, the latter stubborness in the horse trader's book. The side view should show a comparatively straight line from the poll to the nose. Heavy jaws are not desirable.

The mouth should be examined for unsound or abnormal teeth. If the upper teeth overlap, a condition known as parrot mouth, or if the reverse is true, the horse is unable to bite off feed and will starve on short pasture. He will, however, be able to eat hay and grain by "lipping" them.

The nostrils should be large, clear and pliable, rose colored at rest and deep red during exercise. Constantly distended and hard nostrils might indicate heaves. If the lips are not held firmly together this may indicate what a loose mouth indicates in a human being, lack of spirit and vigor. Look for twitch scars as these may indicate some bad habit, such as being hard to shoe.

HORSES are particularly susceptible to blindness. It is for this reason that tales involving skullduggery in horse trading almost invariably revolve around slick methods of passing off a blind horse.

A story is told of a buyer who had about made up his mind to purchase a roan mare. The horse looked good on all points. As a final test, the buyer took off the bridle and smacked it hard across the horse's rump. The mare took off in grand fashion, running across the field smack into a tree.

"I don't want the horse," said the buyer. "She's blind."

"Hell," replied the trader, "she ain't blind. She just don't give a damn."

This method of testing blindness depends upon chance. There are more certain methods.

When you begin to examine the horse's eyes be sure that the animal faces a good light. Large, full, well-spaced eyes, preferably with a chestnut hue, are the least subject to disease. Small, sunken eyes are often weak and may accompany a sluggish temperament. If tears are shed constantly it may indicate disease or a previous injury.

To test the sight make a quick motion of the hand in front of each eye. Be careful not to cause a current of air to strike the eye since a blind horse may close his eye from this cause alone. Have the animal led over obstacles. A horse with good sight will carefully lift his feet while a blind animal will stumble. Take the

horse from darkness to light: the pupils should dilate and contract alike.

Totally blind horses usually hold their heads sideways and when spoken to cock their ears forward quickly. Hollows over the eyes indicate age or lack of vitality. Unscrupulous dealers often inflate these hollows with air but this can be detected by pressing the area with the fingers.

Horses are not often troubled with deafness but it is best to test hearing by responses to the voice. The ears should be spaced fairly close together at the very top of the poll and should be carried forward. There are many tricks used to cover up the defect of lop ear such as tying the ears together with a fine thread concealed in the foretop. Slight operations are sometimes performed to remedy this defect but scars will reveal this. Horses that constantly move their ears should be suspected of being blind or of having a bad temperament. A bad-tempered horse will often flatten his ears when angry.

The poll should be examined for evidences of poll evil, a disease caused by bruising the top of the head. This disease, accompanied by a discharge of pus, is often slow to yield to treatment and leaves ugly scars.

Short shoulders do not generally indicate sufficient space for a large heart and lungs and they favor an undesirable low, short, stubby action of the front feet. Straight shoulders accentuate the concussions resulting when the front feet strike the ground whereas sloping shoulders soften this shock. Strong constitution, endurance, good front action and style are associated with deep, well-sloping shoulders. For draft purposes the shoulders should have pronounced offsets so that the face of the collar will have plenty of bearing surface.

Examine the withers for fistula, a disease similar to poll evil except that it is differently located. The disease is though to result from bruising the withers, the resulting inflammation and pus yielding slowly to treatment and often destroying muscles. Fistula should not be confused with collar sores which are often found on the top of the neck just in front of the withers and on the sides of the neck. They usually respond readily to treatment.

In so-called sweenied shoulders the muscles have atrophied or shrunk and horses with this defect are practically useless for work. As in the case of the hollows above the eyes, shady dealers attempt to round out the atrophied muscles by irritants or by pumping air into them. They are caused by lameness below the knee and can sometimes be cured by treating the lame parts.

A wide, deep chest indicates plenty of room for the heart and lungs and usually a strong constitution. Excessive width accompanied by forelegs set too near the outside is likely to cause the horse to "paddle" with his front feet. A narrow chest with close-set front legs results in interference of these limbs when moving.

AT a recent horse auction, the author asked a trader to relate his most humiliating purchase.

"I was a kid," he said, "just about 18, and thought I was pretty smart when it came to buying a horse. Well, I had some money that was aching for a sale, and heard of a mare that could be bought. I didn't think of it until later that it was the man who owned the horse that dropped the tip to me at an auction. I went around one day to look over this horse. It was quite a mare. I scored it point by point and it showed up first rate. When it came to her legs, I trotted her around a while, and the horse was as springy as a willow. Well, I bought her —a steal, I thought—for $85. The next day the horse was lame in two legs. That's how I came to know about novocaine injections."

Close examination of a horse's legs cannot be overemphasized. Remember that a horse with three good legs and one defective leg is not three-fourths effective he is totally useless.

A vertical line from the point of the shoulder should fall on the center of the knee, cannon, pastern and foot to indicate a good foreleg. When viewed from the side the foreleg should follow a vertical line from the center of the elbow joint to the pastern and back of the foot, and a vertical line should fall from the middle of the arm to the center of the foot.

The structural examination of the forelegs logically begins with the forearm, which should show strong muscular development on the outside just below its junction with the shoulder. For speed it should be much longer than the cannon. The knee-cap should be broad. Scars on the inside of the knee may be from interference in moving. The cannon in which the tendons and bones show prominently beneath the skin will stand hard wear because the tissues are of dense, tough character. The fetlock joint should be large enough to denote strength without being coarse. Pasterns that are moderately long and that slope at an angle of about 45 degrees with the ground aid in producing an elastic, springy action and will absorb jars much better than short, upright pasterns.

Horses which have been trained for work on city streets can rarely be successfully transplanted to farms. The city horse which has known only pavements and a feed bag instead of soft loam and green pastures can be identified by the condition of his feet and legs. The joints are likely to be puffy and the feet show the result of constant shoeing. The country animal habitually goes barefoot unless it is used on the highway. His feet are inclined to be somewhat flatter and broader than those of the horse which is never without shoes.

Blemishes and unsoundness in the foreleg include: Bony prominences known as splints, found on the inside of the cannon below the knee, which may cause lameness when near the knee; bucked shins or bowed tendons, respectively an enlarged front part of the cannon and enlargement of the tendons in the back, which are caused by overstraining and often treated by a firing iron; sidebone, on the sides of the coronet, a hard and rigid prominence which causes lameness and interferes with action; navicular disease is to be suspected when a horse stands with a forefoot extended with only the toe resting on the ground. This disease seriously impedes gait and causes lameness.

The conformation of the barrel has much to do with the horse's health and appearance, as it determines to a considerable degree the size and strength of the vital organs. The back should be short and straight, the ribs well sprung from the backbone and of sufficient length to form a deep barrel. The distance from the floating rib and the point of the hip should be short. This rib should not be sunken, but prominent, so as to give a smooth coupling. A short, well muscled loin, deep flank and short coupling indicate an easy keeper. It should not look tuckered out after a hard day's work.

Blemishes on the barrel are rare. Hernia or rupture sometimes occurs on the abdomen at or near the navel. Some hernias are unsightly only, but larger ones may depreciate a horse's value. An enlarged sheath may be caused by disease.

Be sure that the horse is not a ridgeling; that is, one with a buried testicle. These are often sold as geldings after the descended testicle has been removed. They are often annoying to handle because they have desires and actions of a stallion. They can be completely castrated only by severe surgical operation.

IN inspecting the hind quarters, be sure that both points of the hips are similar and on the same level. They should not

HINTS FOR BUSY HORSEMEN

BROTHER, CAN YOU SPARE $30 FOR A BALE OF HAY?
NOT ADVISED FOR A GIFT HORSE!
SATURDAY AFTERNOON OFF IN THE SOUTH PASTURE.
A GOOD ANIMAL SHOULD BE CLOSE-COUPLED. FAMILY STYLE AND HANDY FOR PICNICS.
A HORSE SHOULD HAVE PLENTY OF SPIRIT.
BOB McGINNIS

be too prominent, but should be a good distance from the point of the buttock. A low or capped hip detracts from a horse's appearance. In draft horses the hip should be broad and the muscles on either side should stand well above the level of the spine if the horse is in good order. In the lighter types the hips should be smooth and more nearly circular. In general, width across the hips denotes power.

If the tail has been rubbed, it may be due intestinal parasites, external parasites or high feeding. Raise the tail and examine for crupper sores, warts and signs of worms, the latter making a horse dull and hard to keep in flesh. The tail should be carried high and straight from the body, naturally an indication of spirit and vigor. Be sure, however, that the horse has not been "gingered." There is no limit to which a shady trader will go to make a sale. Part of his stock in trade is a line of double talk. The story is told of a trader called Honest John Morgan who "warned" a purchaser that a saddle horse he was buying liked to sit on rocks. On the way home the mare blissfully squatted down in the middle of a creek and refused to budge. The following day the buyer cornered Honest John and demanded to know what similarity there was between a rock and a creek full of water.

"I plumb forgot to tell you," Honest John said laconically. "Your hoss likes to set on rocks—but she'd druther set on a fish any day!"

The quarters should be round, full, heavily and smoothly muscled and should strongly join the gaskin; the latter also should be heavily muscled. Quarters separated to an unusual height when viewed from behind indicates an animal with a poor constitution. Atrophy of the muscles in the regions of the stifle joint, and the dislocation of this joint, totally incapacitate the animal.

A vertical line from the hip joint should cross the center of the foot and divide the gaskin in the middle; a vertical line from the point of the buttock should coincide with the back of the cannon. Viewed from the rear good hind legs should conform to a vertical line from the point of the buttock crossing the center of the hock, cannon, pastern and foot.

The angle of the hock determines to a great extent the direction of the hind legs. The greater the angle the straighter the legs and the more likely is thoroughpin to develop. If the angle is small the hind leg is crooked and may be weak. Puffy, meaty appearing hocks, covered with thick skin and coarse hair are apt to become unsound. Hocks on which the skin fits snugly against the bones and ligaments generally wear the best. See that the hocks match closely, for failure to do this generally indicates unsoundness. A common defect of the conformation of the hind legs is known as "cut out below the hock" and is detected by a hollowness at the junction of the hock with the front edge of the cannon. It shows weakness and a tendency to develop into curb. A fetlock joint extending over the hoof, called cockle ankle, is caused by contracted tendons at the back of the cannon. It will cause soreness and stiffness.

Thoroughpin is due to a collection of synovia (joint water) in the depressions which lie just below the tendon running from the point of the hock into the gaskin. It can be detected by pressing the swelling on one side of the leg and noting the corresponding filling up on the opposite side. Thoroughpin causes lameness.

Bog spavin is an enlargement in the natural depression on the inner and front part of the hock formed by a collection of synovia, soft to the touch. This sometimes causes lameness. Do not mistake a large blood vessel, which passes over this part of the hock, for bog spavin. It is not serious. Fullness at the back of the hock below the point is due to a thickened ligament which in some cases is ossified. This is known as curb and may cause lameness when first developed.

Bone spavin, located on the inside of the hock where the thick, bony part tapers into the cannon, is a bony enlargement and can best be detected by comparing the inside of the hind legs from squarely in front or behind. If a horse seems to have bone spavin the following test will give further proof: pick up the suspected leg and hold it for a few minutes in a well-flexed position, then start the animal at a trot as soon as the foot reaches the ground; if bone spavin exists in an active form, the horse will limp.

Stringhalt, a disease characterized by extreme and unnatural flexion of the hind legs, can be best detected by backing the animal out of a stall after being idle.

Lameness, due to a variety of causes and in various forms, some not at first apparent, should be a first concern. When lameness is present only at certain times it is known as intermittent lameness; consequently it is advisable to examine a horse on several different occasions. In cold lameness the animal will go sound after he is warmed up while in warm lameness the impediment does not show until after considerable exercise. Flinching when the horse turns quickly indicates shoulder lameness.

Perfection in gait is characterized by the feet being brought up quickly from the ground, by their being carried in a straight line, by lengthy stride, and by the cycle being completed quickly. All these aid in producing a rapid, frictionless walk, which is a great asset to horses used for any purpose. The defects of gait which may well be noted while the horse is walking are interfering, winging, toeing in or toeing out, and twisting the hind feet just before they are lifted from the ground, which wears out shoes rapidly and is otherwise undesirable.

Does this grinding out of the troubles that may beset a horse seem ominous? It balances out because a horse is the most economical source of power on the farm. Per horse power he costs less than a tractor and his food grows on the land, a product of his own efforts. He starts without profanity or tinkering on cold mornings, he never needs a spare part, and he returns affection and friendship. The price of a single medium priced tractor will buy twice the number of horses needed for the same amount of work.

To test the wind have the horse ridden at a very fast gallop, stopping him abruptly so that you may hear the passing of air through the windpipe. In roaring, or wind broken horses, there will be a whistling sound each time he inhales. When a horse is affected with the disease called heaves, it has difficulty in forcing air out of the lungs, causing a peculiar and very characteristic movement in the flanks and abdomen, especially after exertion. Breathing is not smooth and regular, but abrupt and jerky. Horses affected with heaves usually cough in a characteristic manner after drinking cold water. This cough may also be excited in affected horses by tightly grasping the windpipe at the throat-latch for a short time. A horse's respiration is greatly hindered by either broken wind or heaves.

A horse may possess proper conformation, be sound, and have good action yet still not be well adapted for a specific work; consequently it is very essential that he be thoroughly examined at the work for which he is wanted. If the horse is to be used for heavy hauling or draft purposes, steady pulling under all conditions is an indispensable quality. For harness use the horse should drive promptly and freely with an easy, rapid gait and an alert expression, taking just sufficient hold of the bit to be in hand without causing the driver to pull on the lines. The saddle horse should have an easy, prompt mouth, style, graceful carriage, and should stand quietly to be mounted and dismounted.

Some horses are difficult to harness and object to taking the bit in their mouths; others jump when an attempt is made to place a saddle or harness on their backs; while still others offer a great deal of resistance to having the crupper placed under their tails, which, if due entirely to general muscular strength and tension,

may be an indication of endurance. While being hitched up or mounted the horse should stand quietly and should start promptly but quietly on command. For any purpose the following vices should cause the animal to be rejected; Balking, backing, rearing, kicking, striking with the forefeet, or running away. Less important vices are: Throwing the head up or down, shying, scaring, breaking loose when tied, resting one foot upon the other, grasping the bit between the teeth, rolling with the harness on, or switching the tail over the lines. Occasionally the last-named vice causes the horse to kick, in which case it becomes dangerous.

Enlargements or scars (due to deformity, unusual mishap, or uncommon disease) not conforming to any of those discussed, should cause a horse to be rejected unless the nature of the cause and the detriment to the value and usefulness of the animal is well understood.

The color of a horse is a matter of taste. However, whitish horses show the stains of the stable more than the darker colored and are more difficult to groom because of this. In the days of gypsy horse traders, and in the early west when horse stealing was a recognized profession, it would have been wise to determine if the colors of your recently purchased horse were fast. This is probably a superfluous precaution today for records show that there has been but one arrest for horse stealing, for instance, in Ohio in ten years.

WHICH sex makes the best worker is a matter of opinion. A mare is more docile as a rule than a gelding but is inclined to have less spirit. A mare will not foul a stall as much as a gelding and for this reason is preferred by some. Some farmers say a mare has not the endurance of a gelding, but this is questionable. If a mare is used for breeding the owner must count on a four-week idle period and this usually occurs during the busiest season. Stallions rarely make good draft animals.

Other things being equal it is wise to buy horses that have been worked together as a team since they were broken to harness. Animals bought singly and placed together in harness may be difficult to train and even may have habits, not undesirable in the individual, which might prevent their use as a team. One does see, however, good work from teams ill-matched as to size, sex and breed. Mules and horses can work together and this combination is said to have many advantages, especially if there is affection between the two. This can be a real factor in the effectiveness of any team.

The guarantee of quality that usually goes with a registered animal is all-important to most men who deal in farm animals. However, it is questionable if it is wise for the small farmer (or the big farmer, for that matter, if he uses horses only as a supplement to his mechanized equipment) to invest the added amount demanded for registered horses. There are many fine draft animals, which are not registered, doing the job expected of them. In our grandfather's day few horses, except trotting and saddle horses, were registered and in that era the horse was king of our farms. If you find the animal you want for the job his ancestry matters little. If you show your horses they must be registered.

Experience gained by examining large numbers of horses will aid in quickening the eye and judgment thereby making it possible to perceive readily any unusual condition, but it should be remembered that a hurried examination is likely to prove a disappointment; consequently plenty of time should be taken in making the examination, because time is much cheaper than money tied up in an unsatisfactory horse. In some countries as many as nine days are allowed by law to the purchaser in which to learn of possible misrepresentations, unsoundness or vice in a horse. A seller who has an honest article for sale should not refuse a buyer a reasonable time to try out the animal.

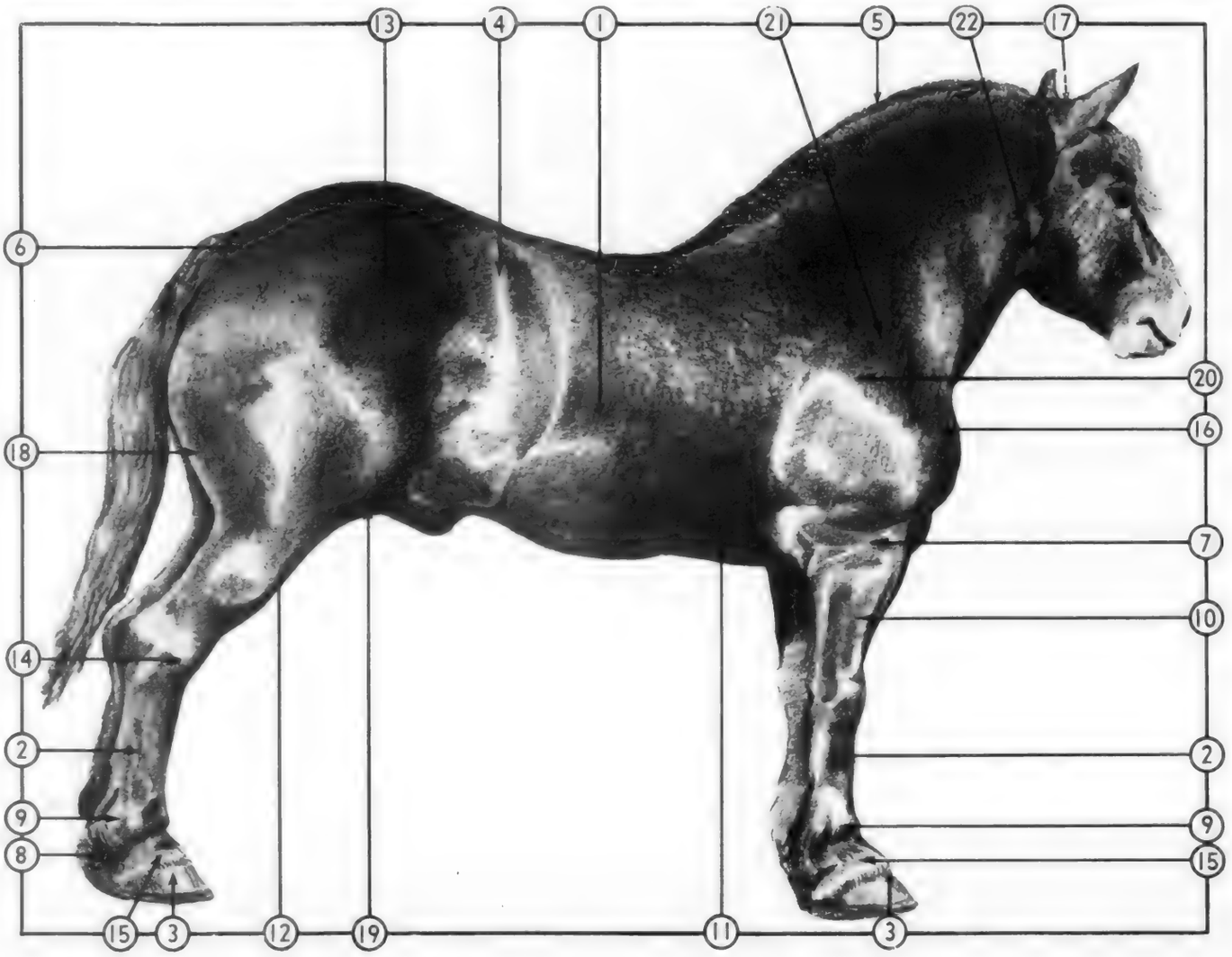
Horses offered at auction sales should preferably be thoroughly examined previous to their being brought into the ring; at least they should be tried out in compliance with the rules of the sale before time for settlement.

Horses, like people, are seldom perfect; consequently in judging them weigh the good qualities against the bad. A horse should be valued by the amount of service it will perform rather than by its minor shortcomings.

Americans have horses in their blood for they conquered the frontier together. A farm is not complete without a horse just as it is not complete without a dog. A horse provides a natural companionship in toil, so necessary to rural life. Man and horse return from the fields together at the close of the day, both covered with the soil and sweat of their calling. They drink deep of the cold water from the spring beneath the land, they rest at night after a day well-spent. No such partnership as this can exist between a man and a machine.

POINTS OF THE HORSE

1. BARRELL 2. CANNON 3. CORONET 4. COUPLING 5. CREST 6. CROUP 7. ELBOW 8. FEATHER 9. FETLOCK 10. FOREARM 11. FOREFLANK 12. GASKIN 13. HIP 14. HOCK 15. PASTERN 16. POINT OF SHOULDER 17. POLL 18. QUARTER 19. STIFLE 20. SHOULDER 21. SHOULDER BED 22. THROATLATCH



SCORE YOUR HORSE BEFORE YOU BUY

Way of Going—Scores 10 points. Score

1. Walk—straight, strong, active 6
2. Trot—powerful, free, moderate action 4

General Appearance—Scores 16 points.

3. Form—low station, wide, deep, compact, massive . . 4
4. Substance—bone ample, joints broad, proportioned to scale 4
5. Quality—bone dense and clean, tendons and joints sharply defined, leg broad and flat, hide and hair fine, refinement of head, finish 4
6. Temperament—energetic, disposition good, intelligent 4

Head and Neck—Scores 7 points.

7. Head—size and dimensions, in proportion, clear cut features, straight face line wide angle in lower jaw 1
8. Muzzle—broad, nostrils large but not dilated, lips thin, even, trim 1
9. Eyes—prominent orbit; large, full, bright, clear; lid thin, even curvature 1
10. Forehead—broad, full 1
11. Ears—medium size, fine, pointed, set close, alert . . . 1
12. Neck—long, muscular but not thick, well crested, throttle well cut out, head well set on 2

Forehand—Scores 24 points.

13. Shoulders—long, sloping, smooth, muscular 2
14. Arm—short, muscular, elbow in 2
15. Forearm—wide, muscular 2
16. Knees—straight, wide, deep, strongly supported . . . 2
17. Canons—short, broad, flat, tendons sharply defined, set well back 2
18. Fetlocks—wide, tendons well back, straight, well supported 2
19. Pasterns—long, oblique (45 degrees), smooth, strong 2
20. Feet—large, round, uniform, straight, slope of wall parallel to slope of pastern, sole concave, bars strong, frogs large and elastic; heels wide, full, one-third height of toe; horn dense, smooth, dark . 6
21. Legs—direction viewed from in front, a perpendicular line dropped from the point of the shoulder should divide the leg and foot into two lateral halves. Viewed from the side, a perpendicular line dropped from the tuberosity of the scapula should pass through the centre of the elbow-joint and meet the ground at the centre of the foot . . . 4

Body—Scores 11 points. Score

22. Withers—well defined but muscular 2
23. Chest—wide, deep 2
24. Ribs—well sprung, long, close 2
25. Back—short, straight, strong, broad 2
26. Loin—short, broad, strongly coupled 2
27. Flank—deep, full, long, low under line 1

Hindquarters—Scores 32 points.

28. Hips—wide, level, muscular 2
29. Croup—long, level, muscular 2
30. Tail—attached high, well carried 1
31. Thighs—deep, muscular 2
32. Stifles—broad, thick, muscular 2
33. Gaskins—wide, muscular 2
34. Hocks—straight, wide, point prominent, deep 6
35. Canons—short, broad, flat, tendons sharply defined, set well back 2
36. Fetlocks—wide, tendons well set back, straight, well supported 2
37. Pasterns—long, oblique (50 degrees), smooth, strong 3
38. Feet, large round (slightly less than in front), uniform, straight, slope of wall parallel to slope of pastern, sole concave, bars strong, frog large, elastic; heels wide, full, smooth, dark color, horn dense 4
39. Legs—direction viewed from the rear, a perpendicular line dropped from the point of the buttock should divide the leg and foot into lateral halves; viewed from the side, this same line should touch the point of the hock and meet the ground some little distance back of the heel. A perpendicular line dropped from the hip-joint should meet the ground near the centre of the foot 4

Total 100

A score of 70 to 80 indicates a passable horse; 80 to 90, a good horse; 90 to 100, an excellent horse. Remember that few horses are perfect. Remember also that this chart is only a guide and that faults are subjects for separate consideration. A totally useless horse, useless because he has a fault, may score rather high.

LIKE A RUSTY NAIL, accident liability menaces the unwary farmer without protective insurance.

KEEP OUT OF COURT

BY E. A. COWIE

A FEW YEARS ago the farm hand who had a bite taken out of the seat of his britches by a mean-tempered horse would have sat on the edge of his chair to eat and kept the humiliating accident a secret. Not so in this era of New Deal social legislation. Today—if need be—the hired man sues his employer. If the latter is an old time farmer he yells loudly that it's unfair, goes to court, and is soundly beaten.

No longer can a farmer bank on being practically judgment-proof in damage and injury suits. On the contrary, with accidental deaths in agriculture leading those of the six major industries by nearly 25 percent of the total, with man-hours lost in minor farm injuries last year sufficient to have produced five bushels of corn for each person in the country, new labor laws have been adopted which make the farmer a highly vulnerable fellow. When sued by an injured employee nowadays he is apt to leave the courtroom with an anemic looking pocketbook and the conviction that he received a raw deal. Actually, the very fact that it was necessary to bring him to court to effect a settlement may have, by law, denied him the use of certain defenses—without which he was at the mercy of the jury.

How To Avoid Lawsuits

THERE are two ways in which a farmer can avoid most of the dangers of becoming involved in lawsuits. One way is to renounce all material things—including his wife and kids—to become a hermit in a land where caves are free and taxes unheard of. The other way is more popular. He keeps the wife and kids and his farm and simply pays a small premium for protection against lawsuits.

Employee-injury suits, the greatest risk of all, can be easily avoided by the farmer who lives in a state where farm labor has been brought under the State Workman's Compensation Act. If not already subject to the protection of the act, or if he employs fewer than the number of persons required to bring him under the act, the farmer may subscribe to it voluntarily by paying the premiums and serving written notice to his employees. Eight states now have definite provisions in their workman's compensation acts to cover farm labor. In some of the eight states it is compulsory for farmers to subscribe to the act; in others, elective. They are:

Arizona—Compulsory if farm laborers use machinery.

California—Compulsory if payroll exceeds $500 (unless rejected).

Connecticut — Compulsory if five or more laborers are employed.

Illinois—Compulsory if not specifically rejected.

Maine—Compulsory if not specifically rejected.

New Jersey — Compulsory but farmer need not insure.

Ohio—Compulsory if three or more laborers are employed.

Vermont—Compulsory if seven or more laborers are employed.

In nearly all other states, where it is not definitely provided for, farm labor can be brought under the workman's compensation act at the definite election of the employer or, in some cases, at the election of both the farmer and his employees. When farm labor is excluded from the act, a farmer can protect himself from employee-injury suits by taking out Employer's Liability Coverage. This can either be purchased as a separate policy, or the farmer can add it to his present public liability coverage.

If a separate policy seems desirable, it will pay a farmer to shop around before buying. Some of the newer contracts now include "Medical Payments Coverage" at the basic rate, which means that regardless of the cause, the insurance company will pay the medical bills of injured employees up to the limits of the policy. In other words, this type of policy provides coverage without question up to the limit of a farmer's purchases. A straight Employer's Liability Policy does not do this. If a valuable employee is injured under circumstances where there is no conceivable negligence on the part of the employer, the straight Employer's Liability policy does not cover medical bills. As a result the employer will be faced with either paying the medical bills out of his own pocket, or risking the loss of a disgruntled employee.

How the Protection Works

ONCE a farmer has subscribed to the workman's compensation act an employee may not sue him at common law for injuries, nor can suit be brought against him by the heirs of a person killed during the course of employment. Instead, all claims for compensation against the employer will be settled by the State Industrial Commission, or its equivalent.

Similarly, when a farmer takes out Employer's Liability Coverage he shifts the burden of responsibility to the insurance company which, in return for the premium he pays, must settle the claims of injured employees. As an example, Frank Hilliard, a Michigan farmer, purchased an Employer's Liability Policy from an insurance company recommended by his county agent. A month later two of Hilliard's hired men were severely injured when they became pinned beneath a load of cordwood. In accordance with their contract, the insurance company promptly began paying both injured men a stipulated weekly benefit. Moreover, the company also paid for all hospital and medical services. Had either of the men died as a result of his injuries, burial expenses would have been paid and restitution made to his dependents.

THIS FAMILIAR PRACTICE of field hands who don't want to carry their pitchforks to the barn will certainly surprise, and perhaps injure, the man on the load.

A BUSY HORSE FLY or even a sudden whim may start this team on a trot down the field. What then of your fingers and toes, little man in front of the sickle bar?

THIS FARM HAND doesn't hear the shouted invitation to the hospital from the scythe in the tree, the sickle hidden in the grass, and the leaning hoe.

As a result of having taken steps to protect himself, Hilliard was at no time in danger of being sued at common law. Lacking protection, however, he would have been in the same position as Christen in the Ohio case of State vs. Christen.

In Ohio, farm labor is subject to the State Workman's Compensation Act if three or more persons are regularly employed. This being the case, Christen, an orchard farmer who employed only two persons except during the picking season, believed that he was excluded from the act.

One summer the extra man he had hired was injured in a fall from a ladder. The injured man's claim for compensation was granted by the State Industrial Commission but thereafter, in accordance with the law, the Attorney General brought action against Christen for the full amount of the compensation awarded. Concerning the question as to whether three or more workmen were regularly employed, the Court said, ". . . since two employees and one more were engaged in the usual course of business at the time the accident occurred, it is immaterial that the services normally lasted for a relatively brief part of the year."

This ruling answers the first of two questions often asked by farmers, i.e.—in states where a specified number of employees come under the workman's compensation act it is a mistake for a farmer to assume that temporary employment of that number of persons for regular seasonal work does not make his subject to the act.

To answer the second question, "What if I refuse to subscribe to the act or otherwise provide for workman's compensa-

A DAMAGED CAR, injuries to its occupants, a dead animal and a law suit are some of the possibilities when this combination appears on the highway.

THE BEST SORT of insurance against stock escaping to the highway through faulty gates is to take away the gate and install a patented contraption such as this. The grass looks greener on the other side, but these cattle won't venture across.

tion?"—let's have another look at the case of State vs. Christen.

In this case Christen was favored by a stroke of luck in that he was called upon to pay according to the relatively moderate scale of the compensation act. What *might* have happened is this: Had the injured man sought the remedy of common law, Christen, by reason of having failed to provide in any way for workman's compensation, would have lost three important defenses; (a) that the employee was guilty of contributory negligence, or (b) that the employee had assumed the risk of injury, or (c) that the injury was caused by the negligence of a fellow employee.

Denied these defenses, Christen would have had to pay the injured employee whatever amount of damages the jury chose to award him.

Public Liability Coverage

THE term, public liability coverage, is used more or less as a "catch all" to describe those forms of public liability and property damage coverages not specifically embraced by workman's compensation or automobile insurance.

Since everyone nowadays is familiar with the type of automobile insurance which covers the use of pleasure cars and trucks on public highways, the chances are that most farmers have already protected themselves on this score. But what about the car operated by a farmer's superintendent or hired man? If an accident occurs while the hired man is acting as the farmer's agent—even though the employee owns the car he is driving—the farmer may find himself in a situation similar to that faced by Clyde Harkness, a Kentucky farmer.

Fortunately, no one was killed the night Harkness' hired man quaffed too much corn liquor and tried to steer his flivver between the headlights of an approaching car. But a few weeks later Harkness was notified that the owner of the other car was suing *him* for damages. Hiring a lawyer with the intention of fighting the case, Harkness learned the worst.

A block of stock salt, it developed, was ample basis for the injured party to bring suit against Harkness, for in buying the salt the hired man had made himself Harkness' agent. The fact that the hired man was driving his own car on his own time when the accident occurred, or even that he had purchased the salt of his own volition, meant nothing in the eyes of the law. Instead of suing the uninsured farmhand, the injured party wisely exercised his right to sue the farmhand's employer. Harkness' best bet, his lawyer advised, was to make a settlement out of court.

Had the hired man performed a simple errand before the accident occurred—even without Harkness' knowledge—the result might easily have been the same. Whenever an employee uses a vehicle in acting as an agent for his employer, it is likely that the employer will be held liable for accidents. "Non-ownership" automobile coverage is the answer to this hazard.

MANY farmers who overlook "non-ownership" automobile coverage in their public liability contracts also overlook the possibility of their unlicensed vehicles figuring in accidents. Perhaps the most common accidents of this sort are those involving vehicles which are without lights. As an example, a Pennsylvania farmer recently hitched a wagon to his tractor and hired out to a group of school

A SNARLED TRIP ROPE and this haymaker will be buried under several hundred pounds of hay. That he was careless won't help the farmer much in court.

SOMEBODY is always falling off of something on the farm. The farther the fall the higher the damages, but any fall may be costly in time and money.

children sponsoring a moonlight hayride. The tractor was equipped with illumination, but the hay wagon was so poorly lighted that a car ran into it. Several children were critically injured and the farmer faced multiple lawsuits.

Another case typical of those involving unlicensed vehicles recently came before an Indiana court.

Charlie Alderman, a tobacco grower, bought public liability coverage for the unlicensed vehicles he used on the farm premises. One day as he was crossing a highway that separated a field from the rest of his property, a truck crashed into his wagon. Alderman escaped injury but the truck driver was cut by flying splinters of glass. When the driver brought suit against him, Alderman found his public liability policy invalid by reason of the accident having occurred on the highway instead of on his farm premises.

All farm vehicles should have full coverage both *on and off the premises.* It would have been a simple matter for Alderman, had he known, to endorse his public liability policy in such a manner as to provide blanket coverage for his unlicensed vehicles. His automobile policy could have been endorsed to provide coverage for all motor vehicles both on and off the premises on the basis of an extra charge for each vehicle.

OF COURSE you may never face the threat of a $120,000,000 fine as did an Illinois beekeeper who violated an ordinance prohibiting domesticated animals, fowls or bees to run or fly loose within the city limits. With 400,000 bees to account for, and facing a possible fine of $10 per bee for each day the bee was loose, the owner had to do a bit of buzzing himself to round up his charges before the court lost its patience.

But though you may be able to cross bees off your list of worries, the fact remains that in most states an owner is responsible for the damage done by his straying animals whether the animals are permitted to roam, or have escaped through negligence. Many lawsuits result from automobile accidents caused by livestock which have gained access to the highways. Other suits arise out of property damage inflicted by escaped livestock. Jake Parsons, an Iowa cattle feeder, for instance, had a steer escape from his truck on the way to the packing house. The steer roamed the city streets for a time, then stepped through a broken picket fence into a garden where a lady was bending over her tomato plants. The episode that followed cost Jake's insurance company a tidy sum . . .

Public liability insurance was the solution to Jake's problem because he had been careful to see that his policy included livestock coverage. Had he neglected this item in his public liability contract, all claims for damages would have had to come out of his own pocket.

(Continued on page 142)

They work for you, long hours, every day, seven days a week and Christmas too. An angry bull, a runaway tractor belt, an overturned wagon can put either one of them out of a job for life. You have a legal and moral responsibility for them if luck turns the wrong way on your farm. There are farm insurance policies, described in this article, that will protect all concerned.

MOST YOUNG PIGS lost by overlaying are crushed between the sow and the sides of the pen. This shows the construction of a hover which keeps the sow away. Some farmers improve on this simple construction by building an electric heater in the hover.

FORMULA FOR FARROWING

BY J. W. SCHWAB

RAYMOND REIFF, HAMILTON, OHIO, had thirteen gelts which farrowed 115 pigs in the spring of 1945. When this picture was taken, 111 of the pigs were healthy and happy. Three were overlaid, and one was killed because it was a squealer. This very low mortality, Reiff says, is the result of constant care, proper quarters, and contented sows. "Happy sows make good mothers," he says. "Excited or worried sows often become cannibals."

THERE has always been the complaint about the high mortality of young pigs. Most hog raisers accept this as one of the hazards of farming. Young pigs die from chilling, from scours, they are crushed by the sow, and some are born dead from no apparent cause. The farmer tosses the dead pigs out of the pen, swears a good round oath and lets it go at that. He considers himself lucky to raise 65 percent of a litter, since records show that only 56 percent of all pigs born reach market.

Yet there is no reason why he shouldn't raise 90 percent of a litter, as repeated experiments under regular farm conditions have shown. The time to save most young pigs is before they are born, and the campaign to defeat a high mortality should begin with the sow from the time she is bred.

Like Greta Garbo, a sow wants to be alone at farrowing time. Like all expectant mothers she wants to feel that her young are safe, that they will be protected, and

will get a good start in life. Every effort should be made to provide comfort and protection, and the peace of mind that all mothers need at this time.

The common farrowing quarter for the spring season is the individual hog house. It is usually at least 6 feet wide and 8 feet long and should be tight for comfort when the weather is cold and windy, and easy to ventilate when it is sunny. The sow should have a clean, well bedded house to live in at least a week before she is due.

Sows should not be confined to their farrowing quarters too closely. Leave them out for exercise each day until farrowing.

Have her house on clean, dry ground, where no hogs have been kept for at least one year. This helps to prevent parasites, especially the dreaded intestinal round worm. The farrowing house should be her home when the pigs come.

It is a big help at this time to have the sows tame for easy handling, that is, tame enough so they will answer you with a grunt when you talk to them. A few hours before a sow farrows, she generally gets busy making a comfortable nest. The bedding should be about two to three inches deep, of dry chaffy straw or corn fodder. Some of our hog men are using ground corncobs or wood shavings. A chaffy bedding is used to prevent the sow, as much as possible, from making a deep basin-like nest in which the pigs are more

PLENTY OF WATER is a must for both the sows and the pigs. Here is a waterer which both can use. It feeds automatically and prevents the fouling of the water and keeps it cool. Notice that three boards have been nailed to the platform to permit the small pigs to reach the water. A hog likes to wash his feed down with frequent drinks.

THESE ARE THE FARROWING PENS on the Reiff farm. Note the abundance of clean straw, the dry slope, the construction to permit sunlight to flood the interior of the pens. Mr. Reiff's hog man, Terrell Hurst, insists that the hog is the cleanest of all animals. "A hog is the only animal that won't foul his own bed," he said.

WHEN A YOUNG PIG isn't sleeping he is eating. This is true of the sow also, which has eight to ten hungry mouths to feed in addition to her own. Note the condition of this sow, not over-fat but in good firm flesh. Her main function is to supply milk.

A SOW of this breed, a Prussian wild sow from the Carolina canebrakes, rarely has a litter larger than four or five because she could not feed and protect a larger litter.

easily overlaid by the mother. The temperature in the farrowing quarters is safest from 55 to 60 degrees or higher. If it falls below 50 the sow and her pigs may get chilled, increasing the danger of losing pigs. Kerosene lanterns have been successfully used in individual houses to raise the temperature. The lantern must be protected from the sow.

Watch the sow about every half hour and if everything is going well let good enough alone. After farrowing, remove the afterbirth and when the sow gets on her feet replace all wet bedding with dry material. It has been my experience that when a sow cannot pass her first pig in 15 to 20 minutes a veterinarian experienced in the use of a forceps should be called. Soon after a pig is born he will wiggle his way to a teat. Often pigs are saved by giving them careful assistance at this time. Also, it is a common practice with many hog men to cut off the points of the long sharp tusks with a sharp side cuttings nippers. These tusks are located just back of the incisors, or front teeth. This can be done soon after birth.

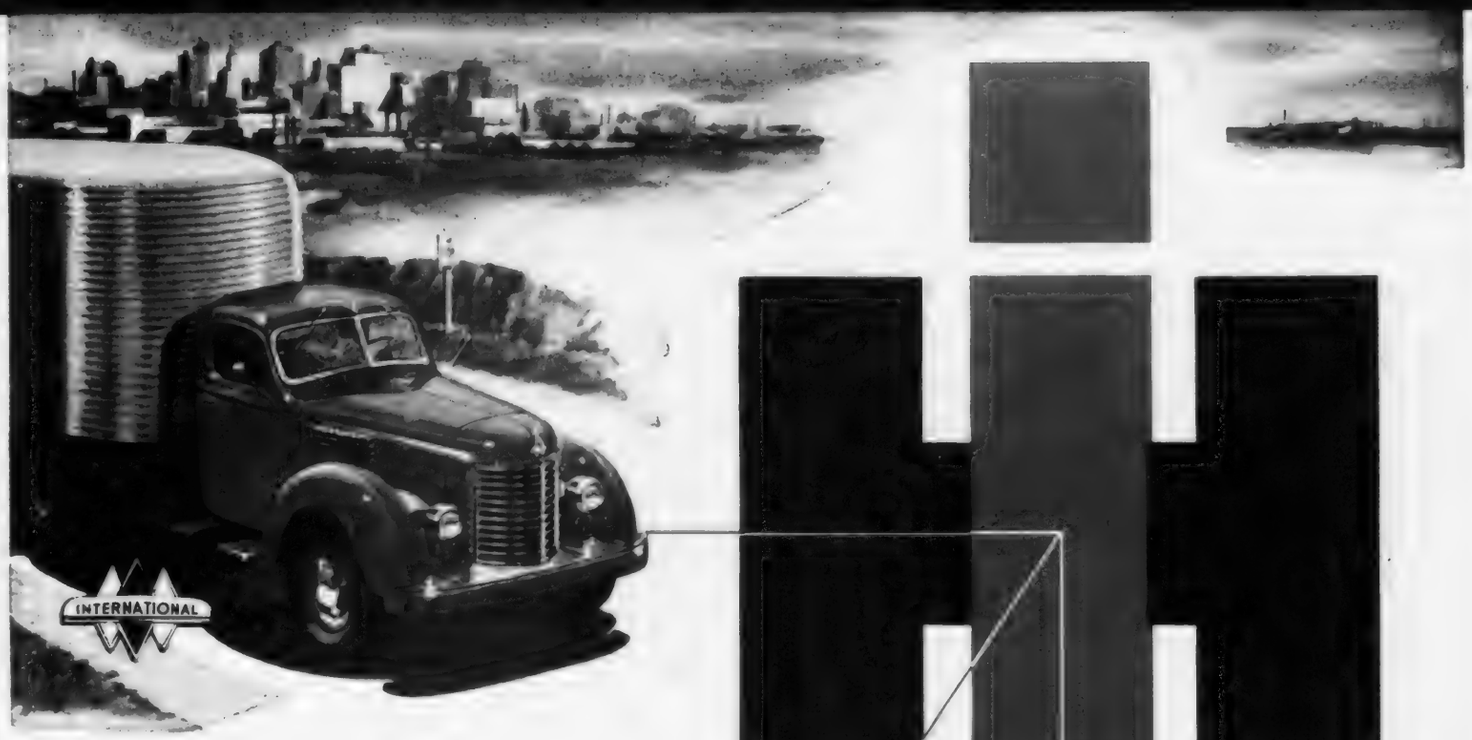
The Pig Hover

Most pig losses occur from one to three or four days after farrowing by the sow overlaying the pigs. To prevent this greatest loss an electric hover is fine. Place the hover in the most comfortable corner in the pen before farrowing starts. It should be fastened so the sow can't move it. A board 10 or 12 inches wide and 12 feet long will make the entire hover. Cut two pieces of the board three feet long and nail them together as a right angle. The remainder will make the complete roof or cover. In the center of the cover cut out a circular hole about 10 inches in diameter. Fasten a 100 watt electric light bulb through the center of an old dish pan or two gallon pail and invert this over the round hole so that light and heat will be directed under the hover. The pan and bulb must be protected from the sow. When electricity is

(Continued on page 138)

PIGS KNOW all about Vitamin D. Here part of Raymond Reiff's spring crop of 111 is absorbing the sunlight; free, too.

A FEED BIN of this type prevents waste and fouling, keeps the feed dry, and will hold a three days' supply for twelve sows.



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THIS CHICK has no future to speak of. He looks as though he doesn't care whether he lives or dies, and well he might. He'll probably die, but if he lives he'll never be vigorous nor thrifty, nor yield profit, for he has coccidiosis.

COCCIDIOSIS

THE SCOURGE OF THE HENYARD

BY C. M. FERGUSON

A CHICKEN with coccidiosis is one of nature's most heart-rending sights. The poor bird is pale, his eyes are lackluster, his feathers are awry, and he stands around all day, peeping in a melancholy key, oblivious to the activities of his fellows, steeped in his own pain and misery. He looks more like something that has crawled out from under a stone rather than the fowl that he is. He wastes away to a mere wisp of feathers, loses all thought of eating and in a short time is found, tramped in the litter of the pen, the victim of the most dread disease of young chicks known to the poultry raiser.

Coccidiosis has been with us a long time. Long before the name of the disease was known to the layman it killed off entire broods of young chicks and was the chief reason why most farm flocks edged out only a slight percentage in birds that reached maturity. Until recently about the only weapon against it was to go out of the chicken business. Lime was sometimes scattered in the hen yard and buildings, various patented but ineffectual potions were fed the flock, or the afflicted birds were destroyed, but it came back year after year, decimating the young chicks. The farmer's wife was lucky to raise half the chicks hatched to the frying stage.

The average poultryman is more interested in knowing how to identify disease and how to combat it rather than in a technical discussion of the life cycle of the germ that causes it. So, we shall come out swinging in common hen yard terms.

What Is Coccidiosis?

No disease of poultry is more widespread or more serious than coccidiosis. It appears in two forms, the acute and the chronic. The acute, or bloody form results from the destruction of the tissue lining the small intestines and blind guts and is more prevalent in chicks from three to six weeks of age. The chronic form results from an attack of a slightly different type of the parasite on the lining of the small intestine. The chronic form produces a prolonged period of unthriftiness, poor growth, low egg production, and paves the way for other diseases. Adult birds can contract the disease but they are much more resistant to it and consequently the effect is not usually serious and often not even noticeable. The disease may lower the resistance of both chicks and adult birds and make them as easy prey to other diseases.

What Causes Coccidiosis?

THE disease is caused by a small, animal parasite which, in order to live, spends part of its life in the lining of the intestine or blind guts. The blind guts are two pouches that lead off the small intestines. These are not to be confused with the large intestine which in the chicken is very small. To understand the disease, it is well to know a few of the facts regarding this parasite, how it lives, and the damage which it does.

The parasite lives in two stages; one stage in the bird, and the other stage out of the bird. Although the damage is done when the parasites are in the intestine, it is just an important to understand what

takes place outside the bird's body, because here is the best chance to combat the disease.

On farms where chickens have been raised over a long period, many mature hens are carriers and the earth in the buildings and on the range may be infected. That is, they may have had the disease in a mild form, but have recovered sufficiently to appear normal. They have enough resistance to ward off serious effects, but the eggs of the coccidia continue to develop in their intestines. They set up housekeeping there and lay copious eggs. These eggs pass out with the droppings and incubate in 24 hours under warm moist conditions. Warm rainy weather is ideal for them if they are in the soil. Wet litter in the brooder house or wet spots around the drinking fountain or range become danger spots. The young chick swallows the eggs with food or gets them from picking around infested areas. Then the trouble starts. The eggs hatch and the parasite starts making a meal off the tender lining of the intestine or blind gut. Tissue is destroyed as the invasion goes on. In about five days after the chicks have eaten a heavy dose of the parasite eggs, blood will be seen in the droppings. The birds become pale about the beaks, shanks begin to bleach, and the chicks appear cold and unhappy, and seek out the brooder stove or a spot of sunshine. They suffer from chills and the wings droop and appetites fail. Many die, others recover; some become carriers but are immune to the disease itself.

Some recover because they are not infected as much as others. If only a few eggs are swallowed, the birds develop a mild case of the disease and recover. These birds will have some resistance or immunity to later attacks.

Others will recover if the general health of the infected birds is high. Healthy, well fed chicks are better able to withstand the disease than weak, poorly developed birds.

The Disease Identified

THE symptoms of the disease are unmistakable: droopiness, paleness, chilling, desire for heat, and bloody droppings. If the disease is suspected, have your veterinarian examine some of the dead chicks or those showing symptoms. If the disease is of the acute form, blood may be found in the small intestine or in the blind gut. If it is chronic, small gray areas may be observed on the outside of the intestine. If the disease is of the acute type, the blind guts will frequently contain cores of hard, bloody or grayish material. These cores may cause considerable swelling of the ceca or blind gut.

The Ounce of Prevention

PREVENTION is the most satisfactory control. Treatments at best are none too good. Plan prevention, keeping in mind the following facts: 1. Old hens are carriers. 2. Warm, moist soil and litter aid

THIS PALE AND WASTED PULLET was struck down with coccidiosis when she was half grown. She has more resistance than a chick and will probably recover but she may become a carrier and will never break records with egg production.

THIS UNINVITING LAYOUT is a partial set of chicken giblets taken from a fowl with an advanced case of coccidiosis. The two large sacks or pouches which look like deformed weiners are the blind guts. Normally they are not nearly as large as they appear here. When the eggs of the coccidia are picked up in the food of the chicken they hatch in the intestinal tract and the resulting offspring at once start to make a meal off the tender lining of the small intestine and blind guts. A hemorrhage results and the blind guts fill with blood. They become distended, inflamed and swollen. Most young chicks can not survive this violent attack on their vitality. The mortality among older birds is lower, but they may become carriers, a constant meance to the flock. Keep old birds away from the chicks, use the familiar ounce of prevention.

development of coccidial eggs. 3. Small doses of the parasite are not as serious as large doses. 4. Healthy, robust chicks can "take it" better than poor chicks.

The following recommendations for combatting the disease are the result of experience in practical control of this disease: 1. Don't overcrowd the brooder house. Overcrowding means culls. Culls are more susceptible to disease. Three hundred chicks in the average brooder house are enough. 2. Use clean range to reduce intake of organisms. 3. Give chicks a full feed before they are let out in the morning. 4. Use heavy litter (4 inches deep). Stir it every day to work the droppings down into the litter. 5. Keep water founts on wire platforms. (Wet areas are trouble spots.) 6. Use wire porches when brooding on infested ground. 7. Get chicks on clean, green succulent pasture as soon as possible. 8. Don't carry infection. Wear overshoes in the brooder house. Or, if possible have someone care for the chicks who does not care for the hens. 9. Keep hens confined to the house or to yards to prevent contaminating the whole farmyard.

How to Handle an Outbreak

AT the first sign of trouble, remove the affected chicks. This will help reduce spread. If the litter is damp, replace it with dry litter and keep it stirred to bury the droppings. Put water founts and, if possible, the feeders on wire frames. If the chicks are on the ground, confine them to the house or move them to clean range or use a wire floored sun porch. Keep the house warm and dry and all range dry.

Killing the small infected chicks will not help much to prevent the spread of the disease, but they should be isolated. Birds which show definite indications that they are not going to grow into strong, healthy birds after an outbreak of coccidiosis should be destroyed on a basis of good economy.

Drugs in Combatting Coccidiosis

DRUGS which have been used as coccidiosis "cures" have not given much encouragement. Many remedies seem to produce results because the disease runs a definite cycle. For instance, birds become noticeably sick five days after infection, most deaths occur on the sixth or seventh day, and by the eighth day improvement is noted.

Sulfaguanidine has recently been reported as proving valuable. Present recommendations are that as soon as the disease makes its appearance, other feed be taken from the birds and they be given a mash, and this can be their regular mash, to which has been added one-half pound of sulphaguanidine to each 100 pounds of mash. The birds can be kept on this mixture from two to five days. Many poultrymen report that two days' feeding is sufficient.

In case of an out-break call your veterinarian and ask him for the latest advice on using this drug. Don't delay—every hour counts. Don't rely on the drug alone—proceed immediately with the steps mentioned above to reduce infection.

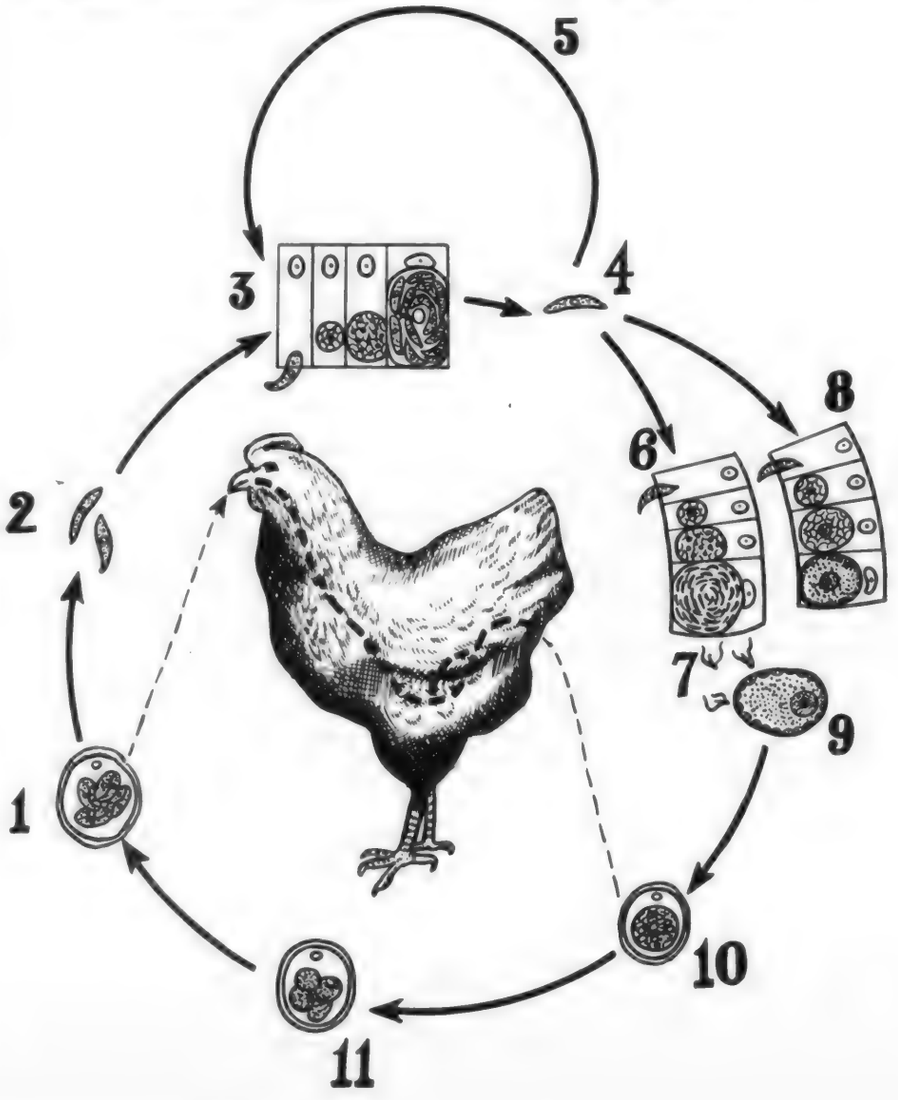
Sulfur in Preventing Outbreaks

THE organism is extremely difficult to kill with ordinary disinfectant. Strong lye solutions used in scrubbing up brooder houses are believed to be effective. Creosoting floors certainly will destroy the organism. Iodine suspensoid or iodine vermicide kills the organisms but is quickly rendered ineffective by the organic matter in the litter. The disinfectants which would be most useful in killing the organism are ineffective in the presence of large amounts of litter. Too many disinfectants tend to lull the operator into a sense of false security.

There has been considerable interest in the use of sulfur in feed to prevent coccidiosis. The University of Wisconsin has found that chicks fed rations containing flowers of sulfur before they were infected resisted the disease. Sulfur was found useless when given after the disease became apparent. It acts only as a preventive. When sulfur is fed to chicks indoors sulfur-rickets result unless the Vitamin D in the ration is increased to four times the normal amount. It is safer to use sulfur when chicks are out in the sunshine getting their Vitamin D from the sun. A further disadvantage is the tendency of sulfur to retard growth.

When no clean range is available, Wisconsin workers recommend that the ration contain five per cent of flowers of sulfur for four days before the chicks are put out on the ground. The same amount of sulfur is then continued for three days after they are out. It is then reduced to two per cent of the ration until hot, dry weather comes. The sulfur should then be discontinued. Sulfur treatment is only suggested where no clean range is available.

LIFE CYCLE OF *EIMERIA TENELLA*, A COCCIDIUM OF CHICKENS: Infective oocyst (1), containing four sporocysts, each with two sporozoites is eaten by chicken. In the intestine, the sporozoites (2) are released from the oocyst. They invade the epithelial cells of the cecum, grow (3), and produce merozoites (4). These enter other cells and form further merozoites (5), or sexual cells. The male gametocyte (6) produces sperm cells or spermatozoites (7), while the female gametocyte (8) produces a single ovum (9). Fertilization takes place, and the resultant unsegmented oocyst (10) is passed in the feces. It develops (11) to the infective oocyst (1) on the ground.



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And tuned to all this picture of cleanliness is the new Clean-Easy "Vac-U-Glass" milking machine heralded as the most modern, sanitary development in the dairy industry. A development of the Ben H. Anderson Mfg. Co. of Madison, Wisconsin, it features all the milking machine improvements looked for by authorities, and dairy farmers during the past thirty years.

"Vac-U-Glass" milking is vacuum in the pail milking - - - in the *glass* pail - - - with rubber inflations. A simple, positive method of producing a regular pulsating machine action is built into this new Clean-Easy Milker. It is highly efficient and easy on the cows. Hard-to-keep-clean pipe lines are eliminated, the milkers are complete in themselves, either the track models or the models on wheels.

All Vac-U-Glass models milk into sparkling glass pails. The pail must be clean or you will notice it immediately - - - a great step forward in producing higher quality milk with a lower bacteria count. In fact, you can actually say it introduces laboratory cleanliness into the dairy barn.

The new Clean-Easy Claw has no threads, cracks or crevices to hide bacteria. You can see through in all directions. Vacuum gauges give accurate reading of pressure applied near the point of milking operation, with individual adjustment of vacuum for each unit. Teat cups are scientifically designed with rubber inflations and metal shells to do careful, complete milking without crawling.

At the beginning of this new season - - - get acquainted with your Clean-Easy dealer. He will give you complete information on this new Clean-Easy "Vac-U-Glass" Milker---
the milker that is blanketed with cleanliness.

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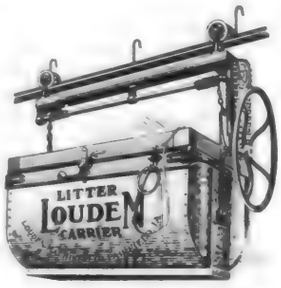

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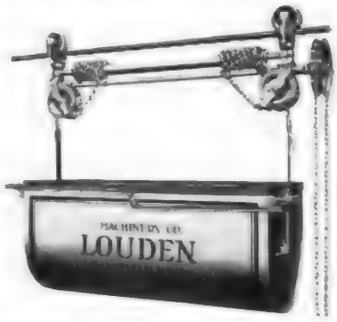
Still First in 1946



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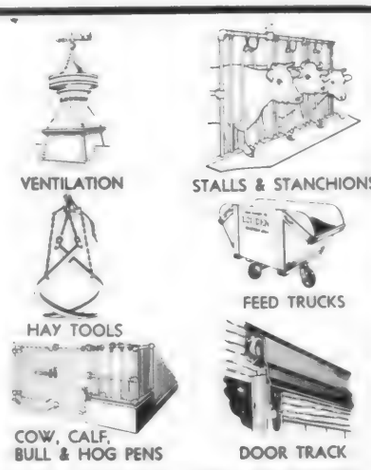
Through the years, these products as well as the complete line of Louden equipment . . . have been constantly improved in design, workmanship, and materials.

For the future, Louden engineers are working on other new inventions which promise to help lighten your barn work even more, reduce your costs, and increase your profits.

So if you're about to build or improve any farm building, remember the first name in barn equipment has always been LOUDEN. Write today for name of your Louden dealer and delivery dates.



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WATER FOR THIRSTY FARMS

(Continued from page 14)

device for building earth dams where it is necessary to move the soil less than one hundred feet. Fresno type of scrapers are efficient for use with both wheel and crawler type tractors. Tractor mounted slip scrapers with hydraulic control are satisfactory for building small dams. For building large farm dams, self-filling and self-dumping earth "carry-alls" are most efficient. They should be used only with crawler type tractors.

Some Special Cases

It is possible to construct successful ponds under several special conditions not mentioned in the foregoing discussion. A strong spring is an excellent source of water for farm ponds. Where there is sufficient spring water it is a good plan to divert all surface water. The pond will then receive nothing but clean spring water, free of silt. Only a small spillway will be necessary. Since there will be no danger of water overtopping the dam, the crest need not be more than eighteen inches above spillway level.

In situations where the watershed is too large it is often possible to construct the pond at one side of the valley. The flood water can be carried around the other side through a diversion ditch. Connect the pond and diversion ditch with a ten or twelve inch tile line. A correctly located tile line will admit sufficient water to maintain proper level, but the greater part of the silt laden flood water will bypass the pond. A culvert type of spillway will prevent overtopping.

In some situations there is a desirable location for a pond but not sufficient watershed to supply it naturally. It may be possible to construct a long diversion ditch or terrace, the outlet to which is into the pond. These terraces serve as large eave troughs of earth around the hill or slope. Give such terraces a grade of less than six inches per hundred feet toward the pond. The velocity of the water in the channel will be too slow to carry an appreciable amount of silt, even if the field above is in a cultivated crop.

The discharge from a system of tile drains is clear water. It is sometimes possible to supply ponds from these outlets. Tile drained land absorbs water during rainy weather and feeds it slowly to the tile lines over a rather long period of time.

A number of agencies render service to farmers in the design or construction of farm ponds. The United States Soil Conservation Service has done much work of this nature in areas where there are legally organized soil conservation districts.

(Continued on page 121)

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New STREAMLINER Everbearing STRAWBERRY
Newest and best everbearing known today. Bears 60 to 90 days after set, and outbears all others. Flavor better than Wayzata.

GIANT MORRISON BLACKCAP RASPBERRY
Not just another Blackcap, but a much larger one—many nearly an inch in diameter. Firm fruit and disease free. This late variety should be planted to lengthen the fruiting season.

Cultivated BLUEBERRIES
Easy to grow, delicious flavor. For own use or big money-makers.

DWARF FRUIT TREES
Our Dwarf Fruit Trees have borne fruit at 2 years old. Supply limited. Priced right. Order early.
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The Gravely ALONE solves every major upkeep problem of the country home or small farm.

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THE UNIVERSAL PEST DESTROYER

KILLS RATS · KILLS ANTS

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CYANOGAS
CALCIUM CYANIDE

KILLS RODENT AND INSECT PESTS INSTANTLY!

This gas-producing powder will solve your pest problem. Used by farmers throughout the world for over 20 years. A little goes a long way.

AT ALL GOOD SEED, FEED, HARDWARE AND DRUG STORES
1 lb. 75c, 5 lbs. $3, (larger sizes, lower). 4-oz. size for ants 30c.
Each can contains leaflet describing more than 50 uses. *It's the gas that kills 'em!*

KILLS WOODCHUCKS · KILLS MOLES

AMERICAN CYANAMID & CHEMICAL CORPORATION
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PARAGON SPRAYER
12-Gallon Capacity

Sprays any solution, disinfectant, whitewash better faster, easier. Kills lice nits, parasites on buildings, gardens, trees. Solution can't settle or clog. If your dealer does not handle Paragon Sprayers, write to us direct for 10-day trial with money-back guarantee.

No. 3 Complete with pipe, hose and nozzle $25.95

One Wheel Truck if Specified

THE CAMPBELL-HAUSFELD CO.
21 STATE AVE. HARRISON, OHIO

WATER FOR THIRSTY FARMS

(Continued from page 120)

The pond work of this agency is generally limited to situations where a farm pond will be a logical part of the soil and water conservation program of the farm.

There is a Federal Cooperative Farm Pond Development Act, known as the "Pittman-Robertson Act." Under the provisions of this act farmers are given engineering assistance in the design and construction of ponds. This act has been in operation for more than a year and some very fine ponds have been built under its provisions. The Act is administered in most states by conservation agencies.

Good Plans Save Trouble

The construction of a good farm pond involves the use of lots of labor, lots of power and the movement of lots of earth. The standards suggested in this article should be considered minimum standards. There is too frequently a strong temptation to cut them down. In ninety percent of pond failures, a ten percent increase in cost would have made the difference between failure and success. If you receive the assistance of an engineer, follow his design to the letter. It will pay you to do so. There are many monuments to pond failures that cost the landowner from a few hundred dollars to fifty thousand dollars each. Most of these pond failures occurred within a year of their construction.

After you have decided that you want a pond and have the approximate requirements for a site, consult your government agency or an engineer.

Many farmers build ponds mainly for purposes of recreation. There is something about a body of water that people like. A well landscaped pond is a thing of beauty; it is a tonic for tired nerves; it will quickly take the owner a thousand miles from the cares of today. The pond can be made a perfect haven for all forms of wild life.

The middle-west has a serious water problem for flood crests tend to become higher and higher while the ground water table seems to reach lower levels each year. Uncontrolled water is the major cause of soil erosion. Small head water lakes together with good soil conservation practices will do much to solve the water problem. Wells and springs are usually improved by a nearby pond or lake.

It is entirely possible for the average pond to supply sufficient fish, the year 'round, for the farm family. Large mouth bass, blue gill, sun fish, crappie, and bull-

(Continued on page 122)

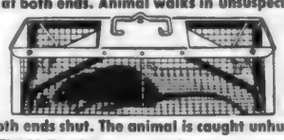
BEES *for Pollenizing and for Profit*

Increase crop yield and produce honey for profit with Muth's package bees and Ultra Violet Ray treated queens. Strong colonies, gentle stock, thrifty workers. Send for beekeepers supply catalog.

MUTH 229 Walnut St. Cincinnati, 2, O.

AMAZING NEW TRAP
Can't harm children, pets, birds or poultry

Open at both ends. Animal walks in unsuspectingly.



Both ends shut. The animal is caught unhurt.

CHILDREN have lost fingers, dogs and cats have had their paws crushed, in old-fashioned spring and box traps. Until now there has been no safe and sure way to avoid these dangers.

But now, an amazing new, all-metal, long-lasting, galvanized trap—called the Havahart—will catch rats, squirrels, and other vermin without fail . . . yet it can't hurt children, pets, poultry or birds. Domestic animals if caught, can be turned loose unharmed.

The humane Havahart has no springs to rust or break—so simple—a child can set it. It is open at both ends. This gives the animal complete confidence. He marches straight in to get the bait—both ends close and he's caught.

A Havahart set near your chicken coops will quickly pay for itself. MONEY BACK if you are not pleased.

Send today for illustrated price list. ALLCOCK Mfg. Co., 89 Water St., Ossining, N. Y.

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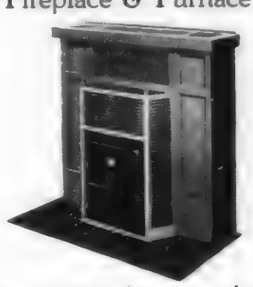

Connected to any chimney as easily as a heating stove and costs about the same. A closed furnace in winter. Heats 3 to 5 rooms on 1 or 2 floors. Burns any fuel. Holds fire over night. Open grate fire in moderate weather. Air-Circulating mantel harmonizes with your woodwork.

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BILTMORE (Asheville), N. CAROLINA

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All herds on Biltmore Farms fully accredited for Bangs and T. B.

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No crop is better than the seed from which it is grown. Plant *Indiana Certified,* "the seed of champions" and make the most of your land and labor. Get the advice of your local Indiana Certified Seed Producer and plant the seed that has the best chance for quantity and quality of production from your fields. Uniformly high yield insures lowest cost per bushel and largest cash return per acre.

Improved, Superior Hybrid Corn, Soybeans, Oats, Etc.

Produced in selected fields, under constant inspection of the Seed Certification Service (the legally delegated certifying agency for Indiana), *Indiana Certified Seed* is clean, true to variety, resistant to common insects and diseases, withstands greater extremes of weather. Here is the seed you need for bigger, better crops. Write for catalog and name of your nearest Indiana Certified dealer.

DEMAND THIS TAG ON EVERY BAG

INDIANA *Certified*
SEED PRODUCERS
WEST LAFAYETTE, INDIANA

WATER FOR THIRSTY FARMS

(Continued from page 121)

head catfish thrive in the farm pond, and are obtainable at government hatcheries. Plant life includes spike rush, water primrose, water willow, arrowhead, pickerel weed, water starwort, wild millet, roundstem bullrushes, spike rush, horned pondweed, water cress and others.

The farm pond as a source of food, which includes fish and waterfowl, comes within the realm of the wild life and game has well trained men in the field who will be glad to help you. There may be one stationed in your own county seat. If not your county agent can tell you where you can get expert advice. There is valuable information in Farmers Bulletin No. 1879, "Ponds for Wild Life," United States Department of Agriculture, Washington, D. C., and in many bulletins published by state departments.

YOU NEED not dam a creek to build a pond. Just tap the natural watershed.

When ready to build a pond on your farm your first step is to write to the agricultural engineering department of the extension service of your state university. You will be informed of what help this service, and state and federal agencies, will give you in surveying, planning and building your pond. You will be surprised how much aid you can get and how economically you can add this important asset to your farm.

All states in the mid-west and bordering states have farm pond programs. Services supplied by the state range from engineering advice only to active and intensive construction programs partly or wholly financed. In almost all states the program is carried on under the supervision of departments of conservation since the construction of farm ponds is regarded as a necessary adjunct to soil, wildlife and forest conservation. Engineering services are free in all states.

Agencies directly or indirectly concerned with farm pond construction and maintenance, all of which furnish varying amounts of free advice and service, are as follows: Agricultural extension services of the various state universities; state agricultural conservation agencies: soil conserva-

(Continued on page 124)

MEET A FEW OF THE "top salesmen" FOR JOHN DEERE TRACTORS

October 17, 1945

"I purchased my first John Deere Model 'B' in 1937, and my present Model 'B' in 1941. They have been in almost daily use since."

Art J. Long
Nevada, Mo.

★ ★ ★

October 19, 1945

"I started using John Deere tractors and implements in 1935, and have since bought two Model 'B' Tractors, one Model 'G' and five Model 'A's'."

Otto Hinze
Hainburg, Ia.

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September 13, 1945

"During the past eight years, I have purchased and operated three John Deere Tractors, Models 'A', 'B', and 'H'. I use nearly all John Deere equipment on my 300-acre farm."

William Fischer
Manitowoc, Wis.

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August 24, 1945

"On this 525-acre farm we operate four John Deere Tractors, a Model 'G' and three Model 'B's'. I like them because John Deere tractors always start regardless of weather."

Oscar Christenson, Mgr.
Hillman Farms,
Rockford, Illinois

★ ★ ★

November 19, 1945

"We now have two John Deere Tractors, Models 'B' and 'A'. This season, these tractors have done all the tractor work on our 325 acre farm and we have helped neighbors besides."

Hillis Erwin
Sparta, Tenn.

NOT one of them carries an order blank—not one is on the John Deere payroll. But their enthusiasm has been responsible for many a sale. They are typical of the "steady customers" for John Deere *Two-Cylinder* Tractors . . . and there are literally thousands and thousands of them.

These men were sold their first John Deere on features they thought a farm tractor should have. They *enthusiastically bought* their second . . . third . . . fourth . . . even fifth John Deere because of their day-to-day, profitable experience with the John Deere in the field.

If you're in need of a tractor, check up on the outstanding advantages of *economy* in operation and upkeep of the John Deere . . . the *simplicity* for more dependable performance . . . the easier, on-the-farm maintenance . . . the ease of handling . . . the *durability* for longer life which *John Deere Two-Cylinder Engine Design gives you.*

John Deere Tractors are rolling off the assembly lines in twenty up-to-the-minute models and six power sizes—for every farm . . . every crop . . . every pocketbook. If you cannot get one immediately, the day is not far off when the type and size that fits your needs will be available. Get in touch with your John Deere dealer today.

JOHN DEERE

Moline, Illinois

August 13, 1945

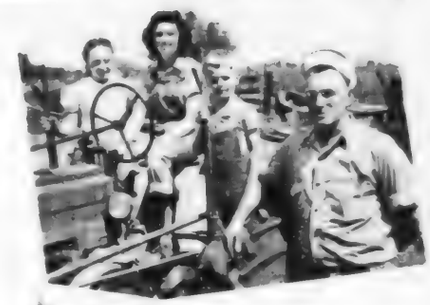
"Do we like John Deere Tractors? Indeed we do. We own three Model 'A's', one eleven years old, one eight years, and one we purchased this spring."

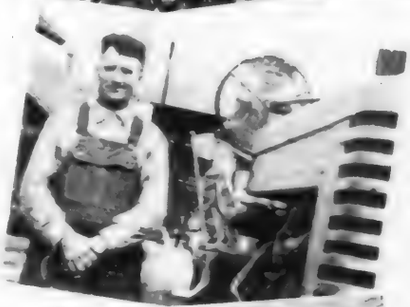
D. D. Denman
Cortland, Ohio

November 15, 1945

"We bought our first John Deere Tractor, a Model 'A', in 1935 and have since owned and operated from 12 to 15 John Deere Tractors at the same time."

Arthur Wells
Helena, Ark.





A COMPLETE WELDING SHOP FOR THE FARM

Mid-States METAL ZIPPER

The Mid-States Metal ZIPPER with accessories and attachments shown below, equips the farm with a complete welding shop. Permits welding, heating, brazing, cutting, bending, soldering and all other operations. No need to go to town and wait for expensive repairs. Do it yourself right on the farm with a Metal ZIPPER.

Ease of operation and automatic arc permits any farm hand to do good welding right from the start with a Metal ZIPPER. It's the one arc welder that works perfectly without the guidance of an expert.

For quick, easy repairs and to avoid costly delays, maintain your farm machinery and equipment with a Metal ZIPPER.

The Metal ZIPPER illustrated above with attachments is built to withstand rugged use. It's portable . . . wheel it about with ease. Lengthy cables, helmet and all other accessories and parts are of highest quality. 9000 Arc Torch provides a low-cost electric flame which is approximately 2000° hotter than acetylene. No need for dangerous gas welding equipment. Do it all right on the farm, with this best of all, easy to operate arc welder . . . the Metal ZIPPER. Write for complete facts today . . . no obligation.

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Mid-States EQUIPMENT CORPORATION
2427 South Michigan Avenue, Chicago 16, Illinois

WATER FOR THIRSTY FARMS

(Continued from page 122)

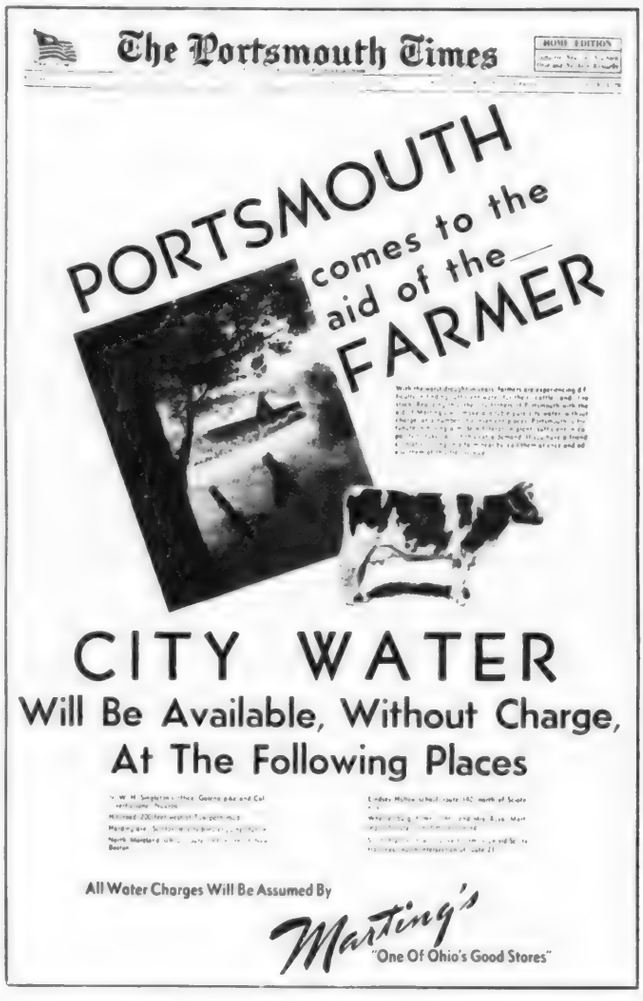
tion services of the federal government and the states; Farm Security Administration (financing); U. S. Fish and Wildlife Service (stocking); federal and state conservation commissions, both wildlife, and soil and water; private agencies such as sportsmen's clubs and wildlife conservation groups.

Conservation agencies operating under the Pittman-Robertson Act are available in every state.

The State Game, Forestation and Parks Commission and the U. S. Soil Conservation Service cooperate in furnishing advice and technical assistance in the construction of ponds in Nebraska. The Soil Conservation Service supplies the technical advice through Soil Conservation Districts and the Game Commission supplies wildlife information.

West Virginia

Through a number of recently organized Soil Conservation Districts in the state a limited amount of equipment for building farm ponds is available. Also available is technical assistance to land owners provided by supervisors of Soil Conservation Districts. Fish for stocking farm bonds may be obtained from


The Portsmouth Times

PORTSMOUTH comes to the aid of the FARMER

CITY WATER
Will Be Available, Without Charge,
At The Following Places

All Water Charges Will Be Assumed By
Marting's
"One Of Ohio's Good Stores"

An advertisement from the Portsmouth, Ohio, Times

OUR GRANDFATHERS' EYES would have popped at this advertisement which appeared in the Portsmouth, Ohio, Times, offering free water to farmers—free if they could find the ways and means of hauling it to their thirsty farms. Scioto county commissioners were quick to see the possibilities of this offer, and provided two 1,000 gallon trucks which hauled water from hydrants installed on every highway leading into the city. Hauls as long as 25 miles were made to areas where wells and streams had been dry for two months and where drillers were unable to find water at any depth.

(Continued on page 126)

FARM QUARTERLY'S AUTHORS AND CONTRIBUTING EDITORS

VIRGIL OVERHOLT'S experience with ponds dates back to a muggy afternoon when his parents caught him cooling his hide in a mill pond instead of hoeing corn. Despite the fact that things were quickly warmed up for him again, Virgil's interest in ponds has never waned. With both Ohio and Wisconsin State Universities contributing to his training, he began tackling farm water control problems at the close of World War I. Many of the farm ponds scattered throughout the country are of his design and it is from a wealth of time-tested experience that he draws an A to Z coverage of farm pond building in *"Water For Thirsty Farms."*

RICHARD C. MILLER is well known for his authoritative writings on agricultural engineering, particularly on the preservation of crops. A graduate of Iowa State College, Mr. Miller has both actual farming experience and years of work in the engineering departments of Ohio State University and North Dakota Agricultural College to back him up in his artificial hay-drying article entitled: *"The Gamble's Gone From Haying."*

J. C. HIDE, author of *"How Deep, O Lord, How Deep?"* was born in Michigan but hails the University of Alberta, Canada, as his Alma Mater. After polishing off his graduate work at the University of Minnesota, Mr. Hide became connected with the Experiment Station of Kansas State College where, since 1939, he has also worked with the U. S. Department of Agriculture in the Research Division of Soil Conservation.

HOWARD DAVISON, whose current contribution is *"A Balanced Ration For Hogs,"* grew up on a 560 acre farm in Woodford County, Illinois, where his people still raise between 300 and 400 hogs annually. After graduating from the University of Illinois in 1926, Mr. Davison returned to farming for a few years before an Ohio Producers Livestock Commission lured him into going to work for them. Since 1940 he has served as an Extension Animal Husbandman at Ohio State University.

(Continued on page 129)

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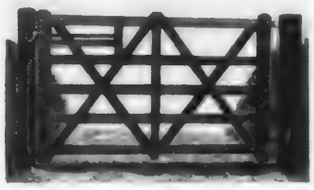
Pickets are woven together with wire. This leaves 1/4" space between pickets and permits passage of sunlight and air



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Made of selected hand-split Chestnut. This fence is available in both the 3 and 4 rail types. A strong, beautiful, long-lasting, all-purpose fence.

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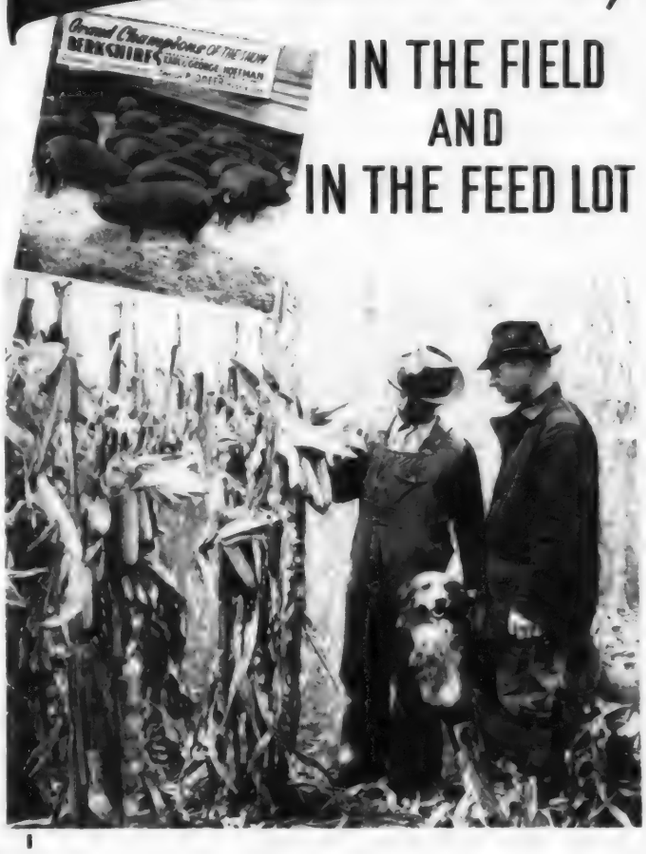
FARM GATES • HORSEBACK GATES • "HAY FEEDER" FOR HORSES

PIONEER Pays



IN THE FIELD AND IN THE FEED LOT

IN THE FIELD

A yield of 164.8 bushels per acre was made by a field of Pioneer to win the official 1945 Indiana five acre corn yield contest, conducted by the Agronomy Department of Purdue University.

IN THE FEED LOT

The Grand Champion award at the 1945 Chicago Fat Stock Show was won by a Carlot of Pioneer fed hogs exhibited by Hoffman Bros., Ida Grove, Iowa.

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Pioneer corn is produced by men who pioneered the hybrid corn industry. They started their corn breeding work in 1913 and marketed the first commercial hybrids in 1924. To-day 15 modern Pioneer plants in Ohio, Indiana, Illinois and Iowa produce quality hybrid seed corn.

PIONEER HYBRID CORN COMPANY
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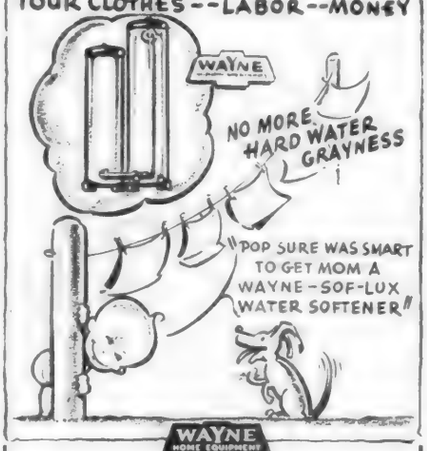
Tommy Wayne says
RAIN-SOFT WATER SAVES YOUR CLOTHES--LABOR--MONEY



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DEEP WELL SYSTEMS — WATER HEATERS
GAS FIRED FURNACES — SHALLOW WELL PUMPS
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with a SO & SO—the little seed drill that will handle small quantities without dribble or waste.

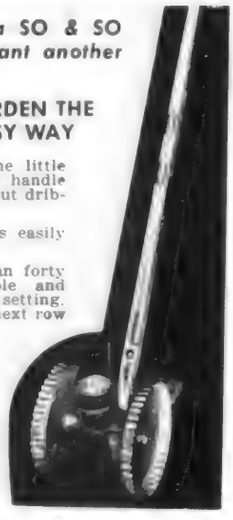
Packets or pinches as easily as pints or pounds.

Indexed for more than forty varieties of vegetable and flower seeds. Instant setting. Sows, covers, marks next row at one operation.

Circular on request

PRICE postpaid—
Seeder only $2.75
Marker extra 45c

SO & SO SEEDER
No. Chatham, N. Y.



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STROUT REALTY
1019 Citizens Bldg.
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OFFICES COAST TO COAST

WATER FOR THIRSTY FARMS

(Continued from page 124)

federal hatcheries located at Leetown and White Sulphur Springs. The state operates its own fish propagation ponds.

Missouri

A total of 11,323 farm ponds were constructed in Missouri in 1943. The Conservation Commission personnel assisted in surveyng sites and planning construction and with other agencies cooperated in financing the costs of many of them and in stocking with fish. This Commission also helped develop 175 older ponds for wildlife. The A.A.A. defrayed part of the cost of many of the ponds in the state. The Commission owns 80 scrapers suitable for moving dirt and will supply wildlife plant bundles at nominal cost. In all it is estimated that 16,000 ponds were built in the last normal year (previous to 1942) and that there are more than 100,000 of all kinds in the state.

Ohio

The Division of Conservation and Natural Resources is in charge of farm pond development in Ohio. The Division has a list of about 2600 ponds in the state. On request, engineers and technicians will survey the site and plan construction. The state will furnish equipment where available, seed and plants, and will stock with fish. Labor and power is ordinarily furnished by the farmer. The state has an extensive conservation program and many thousands of ponds and lakes have been constructed as conservation projects by engineers of the Soil Conservation Service. There were 700 constructed in 1944.

Illinois

Illinois is launching a state-wide, post-war program of farm pond construction tied in with an extensive water and soil conservation program. The recreational angle is being stressed. The Department of Conservation plans to begin construction as soon as men and equipment are released after peace, and will spend $20,000,000 on these projects, many of which will be used as public hunting, fishing, and recreational areas. The state also plans a post-war Pittman-Robertson farm pond program.

Wisconsin

Perhaps because the state is plentifully supplied with lakes, farm pond construction has been limited to soil erosion control. State and federal agencies have constructed about 800 dams which have produced a number of ponds, but the ponds are incidental. The Soil Conservation Department reports that pond construction as a means of erosion control will be encouraged.

(Continued on page 128)

Ali About
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BEES
AND FRUIT

Bees are necessary for profitable fruit production. Cool weather during fruit bloom makes long distance flying impossible. Hive should be located within 200 feet of fruit trees to insure pollination of blossoms.

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Start now to get more money out of your fruit trees. Bees are easy to handle. Complete instructions given in beginner's book.

"STARTING RIGHT WITH BEES"
96 pages, illustrated, ONLY 50 CENTS

GLEANINGS IN BEE CULTURE
60 page illustrated monthly magazine, one year, $1.50. Both book and magazine for $1.70 in the United States and Canada.

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THE A. I. ROOT CO.
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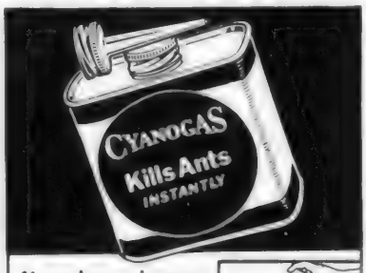

If you have a lawn or garden, keep a can of Cyanogas on hand. This gas-producing powder will solve your ant problem. The spouted can is specially designed for treating ant nests. A pinch will kill all ants in nest—*Instantly!* SPECTACULARLY EFFECTIVE! Easy to apply. A little goes a long way. Drug, hardware, seed stores carry Cyanogas or can get it for you.

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WATER FOR THIRSTY FARMS

(Continued from page 126)

Iowa

The Soil Conservation Service aids in conservation work within organized soil conservation districts. The Soil Conservation Service provides farmers with farm pond plans and technical advice. The State Conservation Commission furnishes technical advice on desirable aquatic vegetation, fish suitable for stocking, and other fish and game matters. In cooperation with the Fish and Wildlife Service of the U. S. Department of the Interior, many Iowa ponds have been stocked with fish and are now sources of food. Many ponds for erosion control have been and are now being constructed.

Tennessee

The Department of Conservation, within the limits of its personnel, will send men into the field to advise farmers on construction and at present will provide fish for stocking if transportation is furnished. Large conservation projects in the state have resulted in limited attention to farm pond construction.

Pennsylvania

Pennsylvana is now engaged in a research program for farm ponds. The state regards itself as lagging behind other states in farm pond construction and plans a much enlarged post-war program. The Agricultural Engineering Department and the Soil Conservation Experiment Station, both at State College, are cooperating. A few ponds have been constructed. Technical service is available from the Operations Division of the Soil Conservation Service.

Kentucky

Kentucky has had a well-organized farm pond program since 1930. More than 18,000 ponds were built in 1943-44 in spite of man power and equipment shortages. The Soil Conservation Service will provide engineering and financial aid to all farmers in soil conservation districts. The Service estimates that 156,500 ponds are needed in the state. State fish and game agencies are giving aid in stocking and managing private ponds. Kentucky needs water conservation badly and plans an enlarged post-war program.

Kansas

Kansas has had a farm pond program for the past 12 years. At present the United States Soil Conservation Service is furnishing technical assistance through soil conservation districts and the state Game Commission is aiding in stocking the ponds. The A.A.A. aids through benefit payments.

(Continued on page 146)

AUTHORS AND CONTRIBUTING EDITORS

(Continued from page 125)

JIM ROBINSON tells us that after a whirl at everything from cub newspaper reporting to steering the old *Leviathan,* he went to work for the American Fruit Growers Inc., and became interested in farming. "Not being a natural born plowman, and leaning to the lazy side, anyway," says Jim, "I decided to raise pigeons and squabs. That was the wisest decision I ever made." We've a hunch that after reading *"Squabs Are My Specialty"* you'll agree with Jim.

MYRON S. HAZEN, author of *"Pasture Improvement,"* was exposed to an early and intimate acquaintance with cows by being born on a Massachusetts dairy farm. Since graduating from Massachusetts State College in 1910 he has been in agricultural research work. He represented the fertilizer industry in 1919 when the excessive quantities of borax in certain potato goods caused serious damage. He is a "fellow" of the American Association for the Advancement of Science and a member of a number of national agricultural committees and has travelled extensively in the United States, Canada, South and Central America in the interest of agriculture. Discouraged at times in his efforts to interest reactionary farmers in pasture improvement, Mr. Hazen has adopted this ancient New England motto for his own:

I hate to be a kicker,
And I always long for peace,
But the wheel that does the squeaking
Is the wheel that gets the grease.

ROLAND McKEE, a veteran of forty years' service with the U. S. Bureau of Plant Industry, has written enough agricultural literature to fill THE FARM QUARTERLY several times over. The major part of his time has been spent in forage crop investigations, with legumes the principal subject. Anyone interested in learning more about the author of *"The Story of Korean Lespedeza"* will find an interesting biographical sketch of Roland McKee in "American Men of Science."

I. A. COWIE, we've decided, is one of the most modest men we've ever encountered. The only background material we can pry out of the author of *"Keep Out of Court"* is a formal—but impressive—statement concerning his law training and admission to various state bars. We do know, however, that he became connected with the Hartford Accident and Indemnity Company in 1925, and has advanced through the various offices in claim and legal work to his present position as Assistant Secretary.

JOHN W. SCHWAB, a recognized expert on hog-raising, has for a quarter of a century proved to Hoosier farmers that "ton-litters are mortgage busters." Partly as a result of the annual ton-litter hog shows inspired by Mr. Schwab and Indiana stockyard officials, Hoosier hog growers have earned a reputation among commission men and meat packers of producing the best market hogs in the Corn Belt. In *"Formula For Farrowing,"* Mr. Schwab sums up the principles of raising ton-litters for maximum profits.

C. M. FERGUSON was born on a farm in Ontario, Canada, which, says he, "proves nothing except that I was there." Entering Ontario Agricultural College on funds provided by the sale of his own poultry flock, he finally migrated to Michigan State College with a graduation certificate in his duffle bag. Six years later he took his new bride on a honeymoon trip to South America where, coincidentally, he had been offered a position as an Agricultural Technician in the Republic of Colombia. In 1929 he returned to the states as a Poultry Extension Specialist. Like the proverbial postman who takes a hike on his holiday, Mr. Ferguson raises chickens on his farm as a hobby. On the side he writes about them—*"Coccidiosis"* in this issue.

CONTRIBUTING EDITORS

KATHARINE A. SMITH, with the Public Relations Department of the United States Department of Agriculture, has spent a lifetime disseminating information on the work of the department. **DR. G. W. SALISBURY,** who is the author of a forth-

(Continued on page 131)

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More important than all of your buildings.
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More important than all the crops you plant.

Among other things, it must contain nitrogen, phosphorus, and potash in about the right proportion, and it must also have the correct pH (degree of sweetness for the crops you are going to plant).

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Winter scene showing the home of Mr. and Mrs. Henry Uihlein, owners of Heaven Hill Farm, and the 120 ft. barn in which their Jerseys are quartered.

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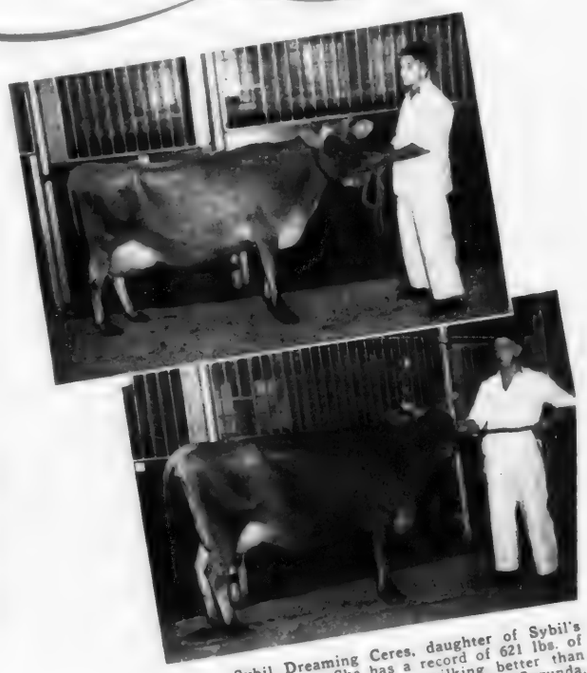
HAS THE National Champion Superior Herd Sire...Great Cows.. AND DE LAVAL MILKING

THE Heaven Hill Farm Jersey herd, owned by Mr. and Mrs. Henry Uihlein, Lake Placid Club, N. Y., possesses real Jersey inheritance and is headed by the National Champion of all superior herd sires, Blonde Lad's Jest 389130. This great sire has the highest butterfat percentage of the entire breed.

The forty milking matrons include such great cows as Blonde Glorious Gipsy, the highest testing daughter of Blonde Lad's Jest; Far Hills Standard Segunda, grand champion of the Vermont State Jersey Cattle Show, September 1945, selected by Ira G. Payne, former president of the American Jersey Cattle Club and owner of the highest classified breeder's herd in America; Valiant Standard Cordelia, great Ton of Gold cow, with a record of 2,047 lbs. of butterfat in four consecutive H.I.R. testing years, from the Claude L. Bellefuille herd at Tunbridge, Vt. She is by a superior sire and out of a paternal sister to the Ton of Gold cow, Pine Lawn Carrie, now headed for better than 20,000 lbs. of milk on her first R.M. test at High Lawn Farm and many others of like quality.

The De Laval Magnetic Speedway Milker is used with its usual success at Heaven Hill Farm and Mr. Wood, herdsman, carries out the De Laval Speedway Method of Fast Milking with precision and with splendid results. This is another instance of the De Laval Magnetic Speedway Milker being selected to milk a valuable herd of high-producing cows solely on the merit of its superior performance.



At top: Sybil Dreaming Ceres, daughter of Sybil's Dreaming Royalist. She has a record of 621 lbs. of fat in ten months and is now milking better than 50 lbs. per day. *Below:* Far Hills Standard Segunda, grand champion at the Vermont State Jersey Cattle Show in 1945.

Maple sugar time is a busy season at Heaven Hill Farm. Each year they hang 2200 buckets to gather the sweet sap and send delicious maple products to all parts of the world. This is a traditional American scene.

De Laval Cream Separators For Cleanest Skimming

More and more new De Laval Separators are now being built. Be sure to see your De Laval Dealer about that new De Laval Separator you have been waiting for. Clean skimming is the first requirement of a cream separator . . . and since 1878 De Laval Separators have been the standard of the world for cleanest, most efficient skimming. In addition . . . they are first in longest life, easiest turning and lowest cost per year of use. A size and style for every need and purse . . . hand or motor drives.

Unposed snapshot of Blonde Lad's Jest, the highest butterfat transmitting superior sire of the breed, now carrying on his good work at Heaven Hill Farm.

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SAN FRANCISCO 19 — 61 BEALE ST.

AUTHORS AND CONTRIBUTING EDITORS

(Continued from page 129)

coming article on artificial insemination, is head of a department at Cornell University. He was practically the unanimous choice of the deans of veterinary medicine of 17 state universities as the man who knows more about artificial insemination than any other veterinarian in the country. He was a pioneer in research in artificial insemination and directs one of the largest and most efficient plants in the country. **B. G. DEWEESE** is farm manager for the Union Central Life Insurance Company. Mr. DeWeese has rehabilitated thousands of farms by a practical application of down-to-earth methods of conservation. He is widely consulted as an expert on contour farming, strip cropping and soil building. Graduate of the College of Agriculture of the University of Missouri. **E. B. POWELL** served in the Navy during the first World War, and has managed the Research Farm for a large feed manufacturer for the past 20 years. He is a member of a number of national associations of agriculturists and the author of scientific papers. **CHARLES KRUTCH** is Director of the Public Relations Department of the TVA and is credited with a fine job of selling the TVA not only to the people of Tennessee but to the country. His fine photographs have been widely used in books and other publications. **DAVE ROBERTS** is a widely read writer on conservation. His column on wildlife, hunting and fishing is one of the most popular in the daily newspapers. **DR. ROBERT GRAHAM** has had a distinguished career in veterinary medicine. He was a captain in the Veterinary Corps in World War I. He was veterinarian of the State Board of Health of Kentucky and is now head of the animal pathology and hygiene department at the University of Illinois. **STUYVESANT PEABODY,** a well-known figure in industrial circles, owns and manages a large farm near Chicago and understands, at first hand, the problems of the farm owner. He is the typical progressive farm owner. **RALPH KENNEY** learned first-hand about poor pastures among the Flint Hills grasslands of eastern Kansas. He has been a county agent and for the past 20 years has served as Soils and Crops Field Agent in extension work in Kentucky. **RAY DUNN,** of Cincinnati, manages a large group of farms for absentee owners. He is active in City Farmer work and has a way of translating government bulletin theories into practical terms. **J. E. McCLINTOCK,** like Miss Smith, has had a long career in disseminating agricultural information. He directs the extension publications at Ohio State University. **RUSSELL E. HORWOOD** is in the Dairy Department of Michigan State College and has carried on extensive research in dairying, particularly in milk production. **DR. GEORGE D. SCARSETH** is director of research of the American Farm Research Association. He has had a long and distinguished career in agriculture and is one of the most lucid writers on this subject. Anyone with a tough agricultural problem immediately thinks of Dr. Scarseth. **CHARLES A. REESE,** State Apiarist for Ohio, has made the study of bees his life work and his stories about them have all the charm of well-written fiction. **BANNER BILL MORGAN** is Associate Professor and Parasitologist at the University of Wisconsin, College of Agriculture. Known in veterinary circles for his experience with livestock diseases, Dr. Morgan's prime ambition is to write articles for practical people.

Rhododendrons for 25¢!

Fine young plants, 12 to 15 in. high, with small earth ball. Not prepaid, pay express on arrival (about 6¢ ea.)

	Price each. 5-24	25-49	50 up
RHOD. MAXIMUM—white, July	50¢	40¢	25¢
RHOD. CATAWBIENSE—purple, June	60¢	48¢	40¢
RHOD. CAROLINA—clear pink, May	60¢	48¢	40¢
KALMIA (Mt. Laurel)—pink-white, May	50¢	40¢	30¢

OFFER A: Five each of the above, packed (20 small evergreen shrubs) for $11.00

OFFER B: Larger, 4 years older, 1½ foot B&B bushy specimens, one each of above plus Azalea calendulaceae (Orange, May) for $12.50

Easily Planted

HINOCRIMSON AZALEA (new 1945) hardy, vigorous, red, evergreen Azalea.
12 inch B&B $6.00
5 smaller, 4 to 6 in., for $7.50

GABLES AZALEAS—New, hardy, all colors. Some evergreen. Small 2 yr. old, 5 mixed $6.00

AZALEA HINOCRIMSON

Dwarf Fruit Trees

Fruit without ladders for picking and spraying! Larger, healthier and on easily-cared-for bushes.

Balanced Home Orchard—takes care of all pollenizing needs: **APPLES:** 1 McIntosh, 1 Wealthy; **PEARS:** 1 Bartlett, 1 Duchess; also 1 Elberta Peach, 1 German Prune Plum.

OFFER A: One each all six, 2-year-old fruit likely 1947, packed complete for $23.00
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HUGE HYBRID BLUEBERRIES—Most sensational of all new fruits. Assorted named kinds 4-year-old, 1½ foot (bearing age) 10 for $19.00

HARDY CHESTNUTS — Blight-free, old-fashioned sweet nuts on Chinese tree. 1½ ft., 3 for $5.00

Young Dwarfs Bear

HYBRID BLUEBERRIES

New Yew Shapes

After years of testing, we offer these forms of hardy (media) Yews. New 1946.

12-inch B&B specimens, each $5.00

PYRAMID YEW—Fast growing, bushy, vertical column. Dark green, rich. Probable height 15 feet. (Taxus media pyramidalis.)

STRICTA YEW—Also vertical but slow dwarf to 6 ft. Dark green, dense narrow.

GRASSGREEN YEW—Bright green form of Stricta Fine.

Previously introduced.

KELSEY YEW—Broad dwarf; most berries of any Yew. 12-inch B&B bushy $2.50

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Upright Yew, 12-15", 25 for $22.50
Hemlock: 18-24", 25 for $22.50
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BALANCED RATION FOR HOGS

(Continued from page 65)

short on vitamins and dangerous if used alone.

Minerals

Simple mineral mixtures have given such good results at most Experiment Stations that it seems foolish to worry ourselves very much over the need for certain trace minerals unless they can be put into the mixture without greatly affecting the price. The mixture used at the Ohio Experiment Station is as follows:

40 lbs. Pulverized limestone
40 lbs. Steamed bone meal
20 lbs. Iodized salt
100 lbs.

Hogs that are to be kept on concrete, wood, cinders or gravel for any length of time should have three pounds of iron sulfate or iron oxide added to the mixture to prevent anemia.

The average hog producer is less apt to run into difficulties because of poor rations than from parasites and diseases. The natural tendency is to blame the feed, but "poor doing" hogs are usually caused by round worms, lice, mange, "necro" or other forms of enteritis. Another common cause of poor gains is insufficient water, or water that is located too far from the feed. Water is our cheapest feed—don't neglect it.

Some of the economic factors in hog rationing have a direct bearing on the type of ration. The law of diminishing returns very definitely operates in the hog business and should be weighed when compounding a ration. As an example, say that your stock hogs are in good condition as to frame and health and weigh approximately 100 pounds. To bring these hogs to 250 pounds will require approximately 600 pounds of a balanced ration and will take approximately 12 weeks. There are several things that should receive consideration when buying feeder pigs, but the two most important are: (1) Are they healthy? (2) Will the market be high enough when I sell these hogs to justify the gamble.

In normal times our highest markets are in August and early September and our lowest markets in December and January. If you have a chance to hit the high market period it will usually pay to feed a balanced ration, but if there is no chance to get the hogs finished by September it may pay to carry them on a two-thirds grain ration with the protein and minerals coming from legume pasture.

BEARING-AGE BLUEBERRIES

with fruit buds, ready to bear this summer.
Write for FREE CATALOG.
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A LETTER TO THE EDITOR INSPIRES A FUTURE STORY

EDITOR, FARM QUARTERLY
SIR:

Driving out to our farm last week I was pretty happy about everything. We had sold out a couple of culls from the dairy herd whose production was under 7000 lbs. a year and whose butterfat test was about 4.1. It looked like our average was going to be a little over 8000 lbs. a cow for 14 cows with the butterfat test of 4.4 for the coming season. What with the milk subsidy and about $1000 we took in from selling culls it looked like our annual gross was going to be $5500. With expenses about $3800 things looked all right.

As I turned in the lane to our dairy I saw the cows were all in the barnyard, although it was a nice pleasant day toward the end of summer. It struck me as odd so I drove right over to have a look. Two of the cows were lying down and had a glassy stare. All the others had a bad case of diarrhea and I never saw a sadder, sorrier looking lot of what last week were some fine registered cattle. Our farm manager was leaning against the side of the barn looking at the cows. He didn't move when I came in and every line of his body suggested worry and consternation.

"What's the matter?" I asked.

"I dunno."

"Have you called a vet?"

"Yeah, also the fertilizer house. We've got 2 dead cows in the barn."

"My God, what did it?"

"Well, I didn't want to put that superphosphate all over the pasture. When cows eat that stuff they get sick. You can't expect an animal to eat a chemical and not get sick. Nobody can—people or animals. They just went to that pasture and licked up all the phosphate and now two are down and two are dead and the rest are sick."

I looked at Otto and decided to keep my mouth shut. I was pretty sure that superphosphate didn't make any cows sick. But, on the other hand, Otto had been with us for a long time and was a competent man and most things he did were right.

I went to our phone and called up the state university to ask who in their opinion was the best vet in this part of the country. They recommended a man about 25 miles away. I called him up and he came over in about an hour and a half.

First, he looked inside the mouths of the dead cows and found the roofs of the mouths had turned a little yellow.

"Do you folks have any buckeyes around here?" he asked. "Are there any wild cherry leaves? Have you had any chemicals put on the pasture?"

I owned up to being responsible for

(Continued on page 142)

PARKS'
BARRED ROCKS
World's Oldest Strain
U. S. R. O. P. BREEDING FARM
Here's high-production bred into America's best meat chickens. Records to 357 EGGS. Rugged mountain grown stock raised on wide, open ranges. Breeders run outdoors almost year round. Write for catalog and prices on EGGS. Chicks and 8-week olds.
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Containing many gorgeous, natural-color illustrations of our finest values in
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It is our most beautiful and complete nursery catalog in all our 77 years. Hundreds of attractive, low-priced suggestions will be found in the New 1946 Ferris Catalog and Planting Guide. Write now—supply limited.
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Let us furnish you with a proved herd sire!
Leading blood lines from W-H-R and Thornton Hereford strains available in one and two year old bulls.

The three Kropps who give their names to our farms: CHarles, ARlene and DONald with three of our stock bulls

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Registered Herefords
Palomino Horses
GRAYSLAKE, ILLINOIS
ROY A. KROPP, Owner
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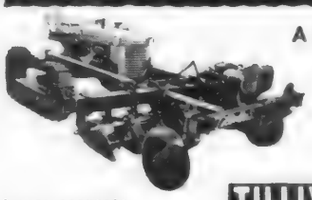
BACKED BY OVER 10 YEARS EXPERIENCE

A COMPLETE LINE—



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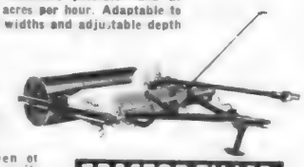
A very accurate means of cultivating narrow row vegetable crops. One man, a tractor and a TILLIVATOR can do a better job of cultivating than heretofore possible—and at the rate of 1 to 3 acres per hour. Adaptable to row spacings, row widths and adjustable depth control.



It harrows, discs, levels and packs the soil in ONE operation—a complete job of fitting the soil. Depth of operation down to 12". Motor driven or power take-off from suitable tractor — standard sizes 4' and 5'.

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ARIENS TILLER

Ariens-Tiller harrows as it discs as it plows—a completely pulverized, level seed bed in ONE operation. Saves hours of labor, operates easily in small spaces—3 models to meet requirements. Complete catalog and name of nearest distributor upon request.

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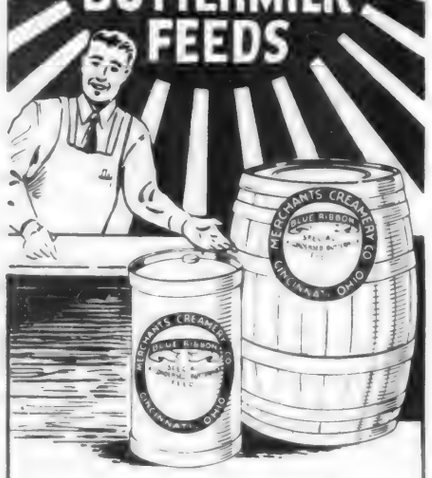
BRILLION WISCONSIN

Blue Ribbon
FORTIFIED
CONDENSED BUTTERMILK FEEDS



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SQUABS ARE MY SPECIALTY

(Continued from page 74)

to install automatic watering systems for poultry. Write the Department of Agriculture, Washington 25, D. C.

Sanitation

Sanitation in the squab house is one of the key points of success. It can not be too forcibly stressed. Disease will stay away from pigeons and squabs if you keep the pen floors clean, the nests clean, and do not allow grain to lie about the floor to become damp and soiled. Sprinkle air slaked lime around once a week. It will absorb cloying moisture. Spray with a good disinfectant once a month and after each periodic cleaning of the entire pigeon loft, which is necessary about every four or five months. Chlorinated lime in the drinking water keeps it pure even if excreta falls in it. It prevents the spread of infectious colds or roup through the drinking water. Directions are on the ten cent can at your drug store. One can will last for months. No patented poultry medicine will work any better.

The general practice with squabmen is to leave the pen floors bare. They will become bare in any event if you put straw, pine needles, sawdust, or shavings, by the sweeping action of the pigeon's wings. They create quite a blast of air when they take off or land and they are doing it all day long. Sand will stay on if the layer is thick enough but it is unnecessary to have litter in any form. Board floors are warm enough. Cement floors should have sand or tarpaper over them as cement alone becomes too cold for the birds' feet during the winter in most localities. A long-handled ice scraper is ideal for cleaning pen floors. Use a hand scraper for nests and perches.

Pigeons are hardy and are subject to few diseases. Chlorinated water prevents the spread of such diseases as roup and colds. Canker is sometimes found in the throats of the birds. This is simply treated by swabbing with iodine or oxide of iron. Paratyphoid is the dread killer. When this disease is suspected, dead birds should be sent to the State lab for diagnosis.

Snakes like young pigeons, and mice and rats like pigeon feed. Keep the pens tight or keep a cat, but be careful the cat does not develop a taste for young squab.

Disposal of Manure

If pigeon manure is fairly free from feathers, save it in a covered shed or pit, where the rain will not fall upon it and dissolve out the chemical components. This manure is valuable for your own garden or may be sold to local florists in fifty pound bags after it has been run through a coarse sieve. The asking price should be at least three dollars a hundred pounds. By mixing it with peat moss, fifty-fifty, you should get more. Pigeon manure by itself

(Continued on page 136)

HANDY Tools to have around the FARM

Whether you garden for pleasure or profit, your work can be made more productive with Dandy Boy Farm and Garden Implements.

This modern line of seeders, cultivators, plows, wheel hoes, mulchers, Krust-Busters and lawn spreaders makes light, pleasant work of tiring, irksome jobs. Dandy Boy implements are light, easy-running tools, built to stand up under the hardest use for years and years.

You will want to know all about these handy tools, many of which are multi-purpose implements. See the Dandy Boy dealer nearest you for more information, or, write direct for the Dandy Boy catalog.

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FARM AND GARDEN IMPLEMENTS
The MIDLAND CO.
Manufacturers, Incorporated 1911
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SINCE 1883 we have been supplying farm needs direct from factory to the user.

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Roofing and
Other Farm
Supplies

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Dept. 146
MUNCIE • • • INDIANA

FARM SCALE ROTARY TILLAGE—PIONEERED BY SEAMAN

WITH ONE TOOL

Method for eradication of quack grass. With hood open weed falls to surface to be destroyed by exposure.

Tillage Superior To COMBINED Work Of

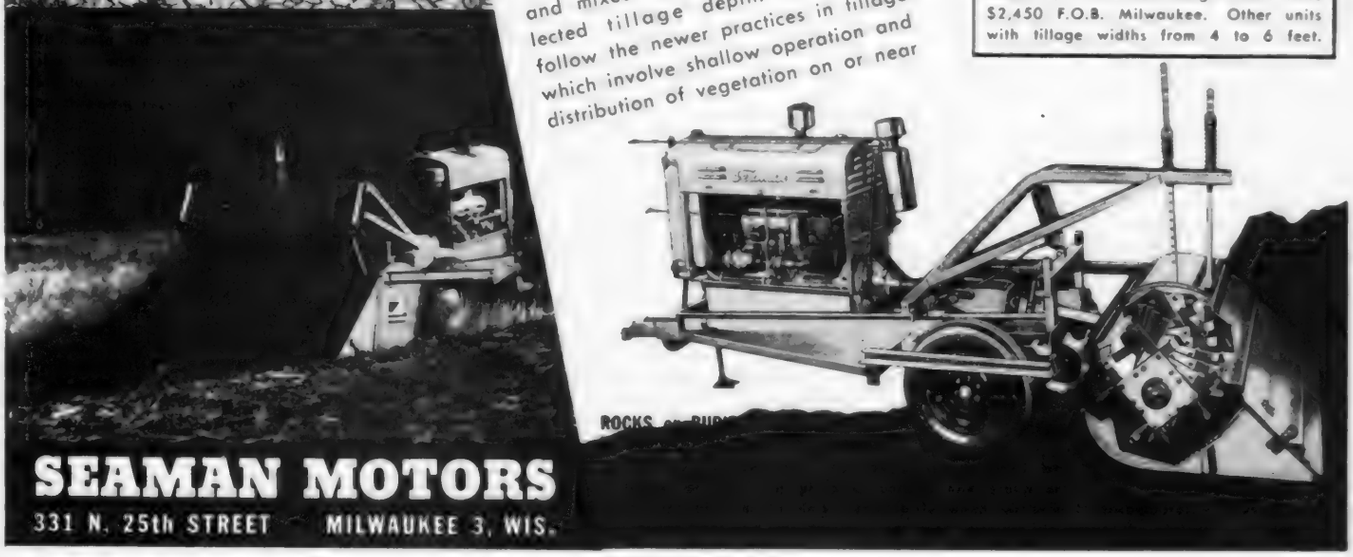
PLOW • DISC • HARROW

The SEAMAN TILLER

Maximum seed germination and bumper crops largely depend upon the quality of the seed-bed. Tillage produced with the SEAMAN TILLER improves the nutrient characteristics of the soil — absorbs and retains more moisture (even through periods of prolonged drought) — helps to combat soil erosion and aids in the eradication of weeds. Most of these attributes spring from the complete and uniform pulverization obtained with the SEAMAN TILLER. Large subsurface, moisture depleting lumps are completely eliminated. No deleterious "plow sole" can occur. Vegetation or any fertilizer is uniformly milled and mixed with soil to the full selected tillage depth. Those who follow the newer practices in tillage which involve shallow operation and distribution of vegetation on or near the surface, find the SEAMAN TILLER admirably and economically adapted to the work. And, of course, those who prefer tillage to the usual depths find the SEAMAN a superlative tool. The SEAMAN encompasses, in one unit of equipment, not only the work accomplished by a combination of conventional soil-fitting tools, but provides a far greater versatility in range of operations, a great superiority in the quality of tillage and consequently, in its benefit to seedling, soil and crop.

Nationally sold for past 8 years. Consult your local dealer or write us for delivery schedules and further information.

The motorized SEAMAN TILLER (Model MHD-72) with 6 foot tillage width. Price $2,450 F.O.B. Milwaukee. Other units with tillage widths from 4 to 6 feet.



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Corn shellers, husker-shellers, tractor saws, Diesel and gasoline engines, hammer mills, limestone pulverizers, concrete mixers, belting.

Sold through established implement dealers

NEW HOLLAND MACHINE CO.
1000 Franklin St., New Holland, Pa.

SQUABS ARE MY SPECIALTY

(Continued from page 134)

is too strong to be used close to the roots of plants and trees. Someone must do this mixing and the one who sells the manure for fertilizer should get the added profit. Mixing can be done all at one time. One man can process several tons in a day. With this extra profit, one does not feel too badly when he does the sanitation chores in the squab house. Pigeon manure has no bad odor.

Dressing and Marketing

Squabs are killed by sticking and are then bled. They are plucked dry while still warm. The head is left on as the soft, immature beak identifies the bird as a squab and not a pigeon, which in the parlance of the industry means an old bird. After the squab is defeathered, it must be decropped. This is done by funnelling water into the crop and shaking out the watered contents to prevent spoilage while in shipment. It takes an average of ten minutes to kill, decrop, defeather, and wash the feet of a bird, to prepare it for shipment.

Culls are bought by dealers. What they do with them is somewhat of a mystery for they are as tough as buzzards. Some are sold to pet shops, some to farm boys who release them to roost about the barn and to provide shooting later on. Of all things, some are bought by undertakers who release them at the graveside to symbolize the departure of the spirit for better lands. The average market price for an adult pigeon is forty cents.

Marketing of farm produce is the final test of the farm business and here the squab raiser has a decided advantage over the general farmer. He has a wide choice to whom and where he will sell them. One doesn't consign a shipment of squabs to a commission man in a distant city, cross his thumbs, and hope for the best. No such haphazard method should be employed. If you plan to ship your squabs, query at least three marketmen about the price they will pay. Always enclose a self-addressed, stamped envelope for a reply. Otherwise, the busy fellow may neglect to answer you. With these three sets of prices, although all may be very close, even the same, you know *beforehand* what your squabs will bring. The expressman at the station can tell you the shipping rate. Thus you will know about what your NET will be. When shipping overnight or longer, and even shorter distances in summer, use plenty of cracked ice in your shipping container. The allowed reduction for the weight of

(Continued on page 137)

ALFALFA-CLOVERS GRASS SEED

FREE SAMPLES

Just tell us what Farm Seeds you are planning to buy this year—get our free samples for testing. Compare our quality and prices. All seed guaranteed true to samples. Try us once and we know you will be with us every year!

FREE CATALOG

Finest values in hardy seeds, new crop, carefully recleaned. Alfalfa, Clovers, Rape, Sweet Sudan; Vicland, Marion and other Oats; Lincoln and Earlyana Soy Beans; Certified Hybrids, etc. A complete Farm Seed Guide. FREE.

SAVE MONEY

Our prices are very low on High Quality, Recleaned, Tested, Labeled Farm Seeds, with a positive guarantee of satisfaction. We buy and sell direct. Have many bargains in Alfalfa, Grasses, Forage Crops.

ALFALFA $20.50 BU. High Purity-Germination
GRIMM ALFALFA $23.00 BU. Hardy Northern Grown
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All our seeds are guaranteed satisfactory, sold subject to 60 days test. Thousands of pleased customers year after year. Write now for FREE Seed Catalog and Free Samples of Seeds you want.

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DEPT. 45
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Guard cows against TRACE MINERAL DEFICIENCY

FARM animals may suffer from a lack of mineral matter and show no visible signs of such deficiency. Correct this invisible mineral deficiency and dairy cows may attain new production marks . . . breeding cattle may evidence added vigor, produce better calves. For this reason many expert feeders supplement rations with two ounces of trace mineral concentrate with bone ash per cow per day. It's an inexpensive safety measure.

HERMAN NAGEL'S TRACE MINERAL CONCENTRATE with Bone Ash

Provides the blood building elements, Iron, Copper, Cobalt . . . Zinc and Boron to help convert food into energy and body tissues . . . Manganese to stimulate vital organs . . . Iodine for health . . . Bone Ash to provide additional phosphorus in soluble form. Gives farm animals the extra minerals they may need for tiptop vigor. Start feeding it right away.

AT YOUR SERVICE

is Herman Nagel, specialist in animal nutrition, to help you with your mineral feeding problems.

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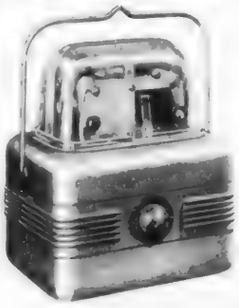

SQUABS ARE MY SPECIALTY

(Continued from page 136)

this ice is twenty-five percent of the total weight of the shipment.

Often there is considerable variation in squab prices within a radius of five hundred miles. Kansas City, for instance, pays less than Chicago. If you live in Iowa, Nebraska, Arkansas, Kansas, or Missouri for instance, you might get a dollar a dozen more NET to ship the longer distance. Squabs take a very favorable express rate. In the East, this is about two and one-half cents for five hundred miles for each squab. Ship only first-class, quality squabs, to prevent down grading by the marketmen.

If you know beforehand what you will receive from some marketmen, you are in a position to better this price by salesmanship. You can write the man who had the top quotation and ask him for more, pointing out that you are selling a strictly quality product. He may raise his ante, or he may hold fast. In the latter case, if you still think you ought to get more for your squabs, avoid the middleman and sell direct to the consumer. There are any number of ways of going about this, but two, time-tried methods are: By telephone to the residents of the wealthier sections of town; and by personal canvass with a few samples. Either way will work nicely and develop a permanent list of customers. Printed matter can be gotten up and placed in stores where you trade. A personal canvass of the better markets, hotels, and hospitals also helps.

Personally, I think the best method is to sell to a hotel which will take all you can raise at a good price. You collect your money immediately and there is the satisfactory prestige that this hotel is using your product. Make friends with the chef.

The U. S. Government through its Department of Agriculture says of squabs, "Nothing easier to raise, nothing finer to eat." For the next three years it is our guess that every one hundred pairs of good breeding pigeons will earn a NET of from three to four hundred dollars. Five hundred pairs will net about $1,800 a year. Five hundred pairs of pigeons may be taken care of by anyone old enough or strong enough to carry a pail of water and a full scoop of grain . . . and do it in about three hours a day, at the outside. In normal times one may expect to net between two and three dollars per pair per year. Thousands of farm folks say they are the best paying specialty on the farm.

EUROPEAN LINDEN

and other beautiful trees that provide good shade quickly. Write for FREE CATALOG.

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Save Money! Build this efficient loader yourself-easily-quickly!

Loader can lift up to 2000 lbs.

Use the power from your tractor to save yourself countless hours of back-breaking labor. If you have either an International Harvester or a John Deere tractor equipped with a hydraulic pump, you can build yourself this amazingly efficient loader.

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You can load manure, move dirt, pull stumps, bull-doze, remove snow, scoop corn, handle baled hay . . . all with this simply-constructed loader. Easily attachable to your tractor . . . this loader can pass through any opening large enough to accommodate the tractor itself. The operator has full, clear vision for any job at all times. Loader is simple to operate and responds smoothly to the controls.

Cost Is Surprisingly Low

All you need in order to build this remarkable loader is a little scrap metal, two American Hoists, and the "easy-to-follow" plans furnished with each set of two hoists. American Hoists are precision-machined throughout to give you years of trouble-free performance. Two machined brass bushings; solid brass packing nut; three times the number of V-Leathers recommended by manufacturers of V-Leathers . . . all of these features assure leak-proof operation. If loader plans and material list alone are desired, send cash or money order for $2.00. Your $2.00 will be refunded upon the purchase of 2 hoists. Write today for descriptive folder showing this loader in actual operation.

Highway Supplies *Road Maintenance Machinery*

AMERICAN ROAD EQUIPMENT CO.

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Need 'Round the Clock Feeders...

Hogs gain weight faster . . . You do less work with HUDSON Equipment

Small stomach — big appetite — that's why a hog is ready to eat *every hour* of the day. Self feeders let hogs put on pounds "around the clock"—make 20% faster gains on 25% less feed according to the U.S.D.A. Put HUDSON Self Feeders in your lot —give every pig a chance—cut down on runts—and save yourself feed, time and labor. They are correctly designed, rain-proof, rat-proof, made to handle all kinds of feed, built to last. Ask your dealer to help you get your HUDSON Self Feeders and other HUDSON "Tested and Proved" Equipment.

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SPRAYERS AND DUSTERS
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99%+ PURE!

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➤ SAVES MONEY . . . Dissolves *thoroughly*—no waste or sediment. Gives accurate control and greater safety in your mixtures—thus giving *better protection* and *increased* yields.

● FREE! Send postcard *today* for valuable free booklet—"Bordeaux Mixture—Its Efficient Preparation and Use."

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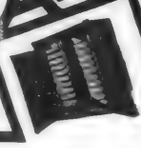
AMERICAN INCUBATORS



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ALFALFA Hardy Northern grown *Dakota 12, Grimm and Cossack . . . Well Known Disco Brands.*
$51.90 PER 100 POUNDS
F.O.B. Mitchell—Bags Included
DAKOTA IMPROVED SEED CO.
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THE BAKER FEED MIXER

•

25 BUSHEL CAPACITY

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THE L. E. BAKER SALES CO.
Dept. J, Swanton, Ohio

FORMULA FOR FARROWING

(Continued from page 114)

not available a gallon jug filled with hot water and renewed several times will keep the pigs warm and start them to sleeping under the hover away from the danger of overlaying or crushing by the sow. Many farmers are using electric hovers.

When Pigs Are Chilled

Badly chilled pigs die. There are several ways to warm them up. One is to fill a one or two gallon jug with hot water, wrap a piece of burlap around it and put it in the center of a barrel; cover the floor with comfortable bedding or burlap, and stretch porous burlap over the top of the barrel. As soon as the pigs get warm they usually go to sleep, and after they wake up return them to their mother.

Water and Feed

Give the sow as much clean water as she wants after farrowing. Warm it in cold weather to prevent chilling. After about two to three feeding periods start feeding the sow only when she wants to eat. Whole or ground oats or wheat bran are good for three or four feeds, then give the sow the regular grain mixture which you have fed previous to farrowing. Here is a good one: one bushel of shelled or ground corn, one bushel of whole or ground oats and eight to ten pounds of meat scraps or good quality mixed supplements. Feed with care for about ten days; thereafter suckling sows may be self fed successfully.

Feeding The Pigs

When the pigs are 10 to 14 days old they will start eating grain. A good pig starter is a mixture of equal parts of ground yellow corn and ground wheat or middlings and 10 pounds of meat scraps or mixed protein supplement. Feed the pigs by the self feeder method in a creep where they will not be disturbed by the sows. Also provide a water fountain, out of which the pigs only can drink, about 10 feet from the feeder.

Daisy Cattle Markers

Delivery one to three days Postpaid
NO. 21—FOR NECK. Adjustable chain. Numbered both sides. Plated. $9.50 per dozen.
NO. 17—FOR HORNS. Adjustable chain. $8.00 per dozen.
NO. 38—DOUBLE PLATE NECK CHAIN. Upper portion strap. Lower portion chain. $12.50 per doz. Sample mailed for $1.00. Write for folder.
GOLDEN ARROW FARMS
Dept. 11, Box 7 Huntington, Indiana

International

KILL FLIES ELECTRICALLY

Electrical elimination of flies, mosquitoes, moths and insects is the safest, most economical and thorough way to end all annoyance, disease and damage. Absolutely no danger. No residue. The cost is less than other methods.

ELECTRIC SCREEN DOORS
1. Electrocutes flies before they get in.
2. Quickly kills all flies that are inside.

ELECTRIC FLY TRAPS
Electrocutes flies that are attracted by food or light if used at night.

ELECTRIC INSECT TRAPS
Used outdoors to electrocute all night flying moths, mosquitoes, hoppers, etc.

ELECTRIC FENCE CONTROLLERS
ELECTRIC STOCK PRODS
ELECTRIC DOG FENCE, ETC.
Control of livestock and animals is positive, also most economical. We manufacture the most complete line of electrical control units.

Write for Full Details — Representatives Wanted.

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EVERBEARING STRAWBERRIES

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The objective of every NEW IDEA machine is always better performance. Some NEW IDEA inventions mechanized farm tasks that were done almost entirely by hand before their advent. Others represent big improvements over machines previously used for the job. Taken altogether, NEW IDEA specialized farm machines today represent definite leadership in the quality of work they accomplish. You are out in front when you buy a NEW IDEA.

Noted for original design and sound construction, NEW IDEA machines invariably operate more perfectly, handle easier, last longer. Every model offered embodies truly progressive features. If you need equipment of the types listed, ask your NEW IDEA dealer for complete information. Or write for free literature.

MANURE SPREADERS
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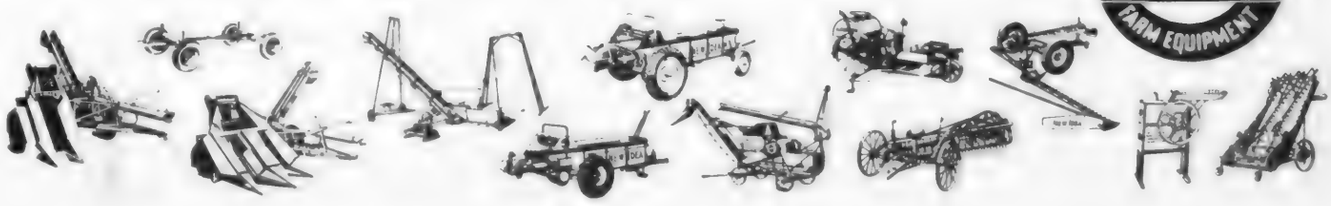

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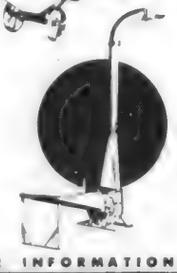
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TO BIGGEST VALUES ON SEEDS

THIS 80-PAGE BOOK of SEED BARGAINS FREE
Berry's amazing Rock-Bottom Prices on Quality-Guaranteed Farm Seeds as well as Flower and Vegetable Seeds, Nursery Stock, etc. will save farmers all over the country thousands of dollars this year. Compare our prices on Alfalfa, Clovers every kind, Hybrid Corn, Brome, Oats, Soybeans, etc. Also all Garden Seeds and Nursery Stock. Seed crops short—ACT NOW. Write for Catalog FREE.
SAMPLES Field Seeds
Tell us what Farm Seeds you are interested in—and get our free samples for inspection. We allow 60 days to test Berry seeds and guarantee satisfaction. Finest values—lowest prices.
BERRY SEED CO. BOX 45-C CLARINDA, IOWA

PASTURE IMPROVEMENT

(Continued from page 81)

vance. It should be remembered, however, that even under the most favorable conditions, not over half of the seed will germinate and any treatment, be it harrowing, or rolling, that will force the seed into the soil will increase the probability of success.

Don't Get Caught On A One-Way Street — Every farmer appreciates the higher nutritive value of the legumes and the ability of the deep rated types to produce larger yields in dry seasons, it is nevertheless a sound procedure to include a large assortment of the better grasses and legumes which are known to thrive in your community. Soil fertility and weather conditions vary widely. Frequently even on adjoining soils seeded the same season, the percentage of survival of different grasses and legumes will be markedly different. By including the assortment of grasses and legumes recommended by your local state experiment station you will be assured of a margin of safety either with new seedlings or patch seedlings which cannot be obtained from the use of a single variety of grass or legume. This is sound diversification which gives added protection, continuous feed supplies and greater safety.

National Aspects—While the farmer must be intelligently selfish in his adoption of a pasture improvement program, the ultimate results will be wide-spread. There is no saner and more economical way to prevent erosion, to slow down the run off, provide greater absorption of water and build up the organic matter in the soil than the establishment of a good permanent pasture. A pound of well decomposed organic matter in the form of humus is a refillable reservoir which will hold more than a gallon of water and gradually release and thus equalize the stream flow, furnish the source of ground water for domestic use and for the growing of crops on adjoining land. A well fertilized sod is the cheapest way to prevent surface erosion and the formation of gullys.

Even on steep slopes, as much as 90 per cent of the water from a sudden storm may be absorbed by a good pasture sward, whereas on naked land the reverse might be true and as high as 90 per cent runoff occur. The conservation of the soil, the prevention of damage to the farmer's own land and to that of his neighbor, are two of the important benefits secured indirectly from a pasture improvement program.

(Continued on page 147)

GOLDEN MUSCAT GRAPES
A wonderful grape. Clusters of immense size, up to 2 lbs. Write for FREE CATALOG.
STERN'S NURSERIES, Dept. V, Geneva, N. Y.

SHALL WE TELL HIM THE SECRET?

"It's not how much air you put in your tires, it's what stays in that counts!"
You can make your tires last longer by keeping them properly inflated at all times and by sealing the valve mouth with a Schrader Air-tight Cap. When you give a Schrader Cap that final turn you know your valve is sealed—your cap is on to stay.
Dealers carry two styles—in the familiar red, white and blue package.

The sealing unit inside all standard Schrader Caps

Get a set today and
MAKE YOUR TIRES LAST LONGER

REPAIR ENGINE CRACKS
in 30 minutes!
Fast Acting . . . Lasting . . . Easy to Use! No special training needed.

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MILLER MFG. CO.
CAMDEN, NEW JERSEY

EVERBEARING RASPBERRIES
and other Berry plants which will fruit this summer. Write for FREE CATALOG.
STERN'S NURSERIES, Dept. V, Geneva, N. Y.

GROW JUNG'S FINE "WAYAHEAD" Earliest Tomato

Big Red Fruit ripening as early as July 4. Regular price 15c packet, but to introduce Jung's Quality Seeds we will send you a trial packet of this tomato, Giant Carrot Cream Lettuce and Earliest Radish, also a packet each of our Giant Zinnias and Double Larkspur to beautify your garden. All 6 packets for Inc. in Canada 20c. A Premium Coupon sent with each collection, also our beautiful free catalog of bargains in Seeds, Plants, Hybrid Corn, Vicland Oats.

J. W. JUNG SEED CO.
Dept. 26, Randolph, Wisconsin

KEEP OUT OF COURT

(Continued from page 110)

Dogs also deserve consideration in a public liability contract, for though a dog may be man's best friend, he can also be an expensive one. In many states a dog's owner is liable for any damage a dog commits *regardless of whether or not the owner* was negligent. The old saying that a dog is "entitled to his first bite" is outmoded. As a matter of fact, you can be held liable for a dog you do not own if you are found to be a harborer of the animal. It is also possible for a tenant-farmer, superintendent, or employee to maintain a dog under circumstances which make the farm-owner liable as harborer of the animal. In Michigan, not long ago, several dogs harbored by a tenant-farmer startled a driver so much that he lost control of his car and it overturned. A $10,000 judgment against the tenant-farmer's landloard resulted. "Property damage and personal injury coverage" is one way to avoid expensive risks of this sort.

A LIABILITY risk often overlooked by producers of miscellaneous farm products is that of foodstuffs. Contaminated milk, meat, or vegetables can be the source of serious illness. A midwestern farmer recently sold some hogs to a butcher who, as a community agent, made the meat into sausage. Several people died of trichinosis after eating the sausage, and the farmer was held responsible in spite of the fact that adequate cooking usually kills trichinosis germs.

Products liability insurance, the answer to this hazard, also covers the sale of livestock. For example, Diedrich Bohmback, a Wisconsin dairyman, sold three cows he had owned but a short time to a neighbor, Dennis Martin. Unknown to either Bohmback or Martin, the cows were diseased. The disease spread into Martin's stock and destroyed most of his fine herd. Martin filed a claim against Bohmback and was reimbursed by the insurance company whose products liability coverage Bohmback subscribed to.

OBVIOUSLY, no single insurance policy can provide complete protection for the farmer. The best approach to the problem is to subscribe to the workman's compensation act (or take out Employer's Liability Coverage); to obtain adequate coverage for licensed and unlicensed vehicles; and to cover other hazards with what is known as a "Comprehensive Public Liability Policy." There are a number of large, reliable insurance firms whose names and addresses your county agent will gladly supply. If further information is desired it may be had by applying at any of the offices of your State Industrial Commission.

In buying new insurance, or in modernizing the policies you already possess, it

(Continued on page 144)

Would You Pay
$1.00 PER TON
For Good Silage in Your Silo?
SAVING 4-10 TONS IS THE SAME THING

BEAR'S TANK
AND
SILO PAINT

FOR USE ON THE INTERIOR OF SILOS, WATER TANKS AND VATS CONTAINING FOODS.

The Paint is . . .

1. Economical
2. Easy to apply
3. Lasting in results
4. Disinfects as well as seals
5. Stops mortar eating in silos
6. Stops seepage in water tanks
7. Will save you dollars and your silo
8. Guaranteed

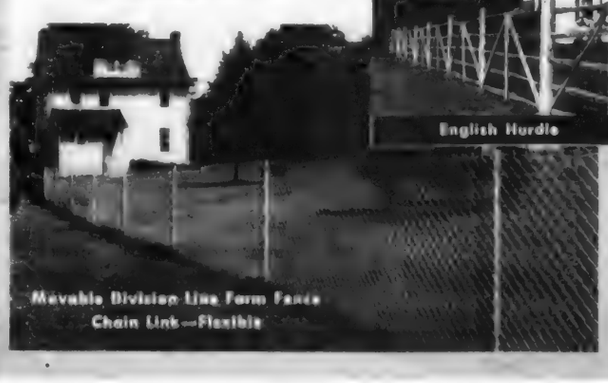
SEE YOUR DEALER OR WRITE FOR BOOKLET

BEAR PAINT CO.
31 RAND ST.
SAND LAKE, MICH.

ATLAS **FENCE** *for fine* **FARMS**

Fence of strong character is a prime essential for making farms and rural estates distinctive. Atlas Fence comes in numerous types for that purpose, and Atlas maintains through many offices and selling agents complete advisory and erecting services. Exceptionally attractive for the purpose are the old-fashioned Chestnut Post and Rail, the Split Chestnut English Hurdle and the special Chain Link movable Wire Fences shown here. Write for illustrated folders containing detailed information.

ATLAS FENCE COMPANY
Venango and Gaul Streets
Philadelphia 34, Pa.



STEEL SILOS

Have Stood the Test of Time

DISTRIBUTORS WANTED—Openings for reliable distributors to sell SILVER SHIELD SILOS and other farm buildings. Write for facts.

FREE LITERATURE—Without cost or obligation, write for literature explaining advantages of Steel Silage.

ANTICIPATE YOUR NEED *NOW*

Down through the years steel silos, more than any other material, have withstood the ravages of wind and weather. More important, Silver Shield steel silos give better silage at lower feeding cost per year. Silver Shield Steel Silo production is underway. For a permanent silo, make your request for a Silver Shield Silo today.

CLAYTON & LAMBERT MFG. CO.
Middletown Division Dept. 104 • Middletown, Ohio

Here's The Actual Results Of This Test
(New Hampshire Red Chicks Hatched April 11, 1944)

		Under Ordinary Glass	Under Warp's Wyr-O-Glass
NUMBER OF CHICKS	At Start of Test, April 11, 1944	104 Chicks	102 Chicks
	Chick Deaths During 31 Days	9 Deaths	1 Death
	Chicks Still Alive May 13, 1944	95 Chicks	101 Chicks
TOTAL WGT. OF CHICKS	At Start of Test, April 11, 1944	10 lbs.	9¾ lbs.
	Wgt. May 11, 1944—31 Days Old	44½ lbs.	94 lbs.
Average Weight of Chicks When 31 Days Old		7.5 oz.	14.9 oz.
Pounds of Food Consumed During 31 Day Test		169½ lbs.	214¾ lbs.
Food Consumed per Chick		28½ oz.	34 oz.
Actual Cost of Producing Each Pound of Meat		12¼c lb.	6⅜c lb.

Hens Under WYR-O-GLASS Laid 4 Times as Many Eggs

In another experimental test chicks raised under Wyr-O-Glass grew into laying Pullets in less than 19 weeks . . . and by the time they were five months old they had laid four times as many eggs as a similar sized flock kept in a poultry house with glass windows . . . on the same kind and amount of feed and care.

Twenty unculled hens in the coop with Wyr-O-Glass windows averaged twenty eggs per month right through the coldest winter months. This was all done on a simple feed formula costing only 2½c per pound. This shows the value of chicks and hens getting the benefit of the sun's Ultra-Violet Rays through Wyr-O-Glass.

The Name "WARP'S" on the Edge Means Satisfaction Guaranteed

Look for the name "Warp's" along the edge of every yard for your own protection. Warp Brothers have pioneered in the development of *Top Quality* Window Materials, all scientifically made to let in lots of the sun's health-giving Ultra-Violet rays. Take this ad with you to your local Hardware or Lumber Dealer, to be sure you get the Warp's Window Material you select. You'll know the Genuine by the name "Warp's" printed right along the edge of every yard, just like in picture above.

FLEX-O-GLASS MFG. CO. (Warp Bros.) Chicago, Ill

LETTER TO THE EDITOR

(Continued from page 133)

spreading 350 lbs. of superphosphate on the pasture and also having a buckeye tree on the farm.

The vet walked over the farm with us after asking the fertilizer people to make an autopsy of the two dead cows. He decided to wait for the autopsy before treating. Meanwhile, he told us to keep the cows in the barnyard.

The next day I called a few people I knew pretty well and asked them if superphosphate ever harmed a cow when spread on the pasture at 350 lbs. to the acre. Everyone I spoke to said superphosphate was harmless to cows and I asked some pretty good authorities, including Myron Hazen and Dr. Morrison.

That night the vet called me.

"Listen," he said, "those cows of yours are poisoned. Are you sure you folks haven't been spraying an orchard or something?"

"No, we don't have an orchard."

"Did you spray anything?"

"Yes, I remember now. Our fences are full of poison ivy and I had a man come out and spray all the vegetation on the fences to kill the poison ivy, because the farm manager and my children had been getting ivy poisoning pretty bad. However, the spray fellow told Otto to keep the cows away from the fences and I understand he put an electric fence wire about 10 feet inside all the fences that were sprayed."

"Nevertheless," the vet answered, "the ivy spray has killed your cows."

I called the man who did the spraying and the facts finally came out. The spraying was done in the morning and there was a heavy mist. The spray caught in the mist and settled over the whole pasture. Damage—two good cows, a pretty stiff vet bill, and a lower milk production for two weeks. Next time, I'll know not to spray on a misty morning.

(Signed) Wm. H. Imler.

The Editor of THE FARM QUARTERLY is grateful for Mr. Imler's letter, for it is of such stuff the magazine is woven. Mr. Imler has given us a tip for a forthcoming article on the unusual hazards that beset the farmer, a practical article that a man can get his teeth into and from which he can learn a few more of the fine points about the fine art of successful farming.

(Continued on page 147)

POULTRYMEN

- **LAYTON PIKGARD'S** (PREVENT PICKING. MILLIONS IN USE).
- **COXOL** (For COCCIDIOSIS & BLACKHEAD in Chickens & Turkeys)
- **BIOMIN** — For Prevention of GIZZARD EROSIONS & Crop MYCOSIS in CHICKENS & TURKEYS.

Send for Free Sample

PRODUCTION LABORATORIES
P. O. BOX 1121 TACOMA, WASH.

TWO GREAT TOOLS DESIGNED TO PUT MORE MONEY INTO FARMERS' POCKETS

30 years of agricultural engineering experience are responsible for the Super Flywheel Momentum of this Hammer Mill . . . and the 3-Way Action of its companion Corn Sheller

THE AMAZING HARVEY RED HED HAMMER MILL – through these many years of engineering development, now gives you a new low-cost way to make 4 bushels of farm grown feed do the work of 5 in meat, milk or egg production.

Three mile a minute speed of the Red Hed's big grinding cylinder makes possible performance you won't believe until you see it run. Yes, with the Red Hed you can grind grain, cob corn, bundle sorghum or roughage with a speed and smoothness that seems like magic.

80 to 280 feed-smashing 12-ton blows a second – that's what the Red Hed is built to deliver. Super Flywheel Momentum, actuated by smoothly running Timken bearings, gives the Red Hed the feed-shattering power that makes production one-third faster and cuts your feed-grinding costs.

An aluminum collector assembly – at no extra cost – rustproof, tough and non-sparking . . . another Harvey "first"! That's one of the plusses that Harvey – America's largest producer of hammer mills – is giving you on its great 1946 model.

AND HERE'S A NEW TRIPLE-ACTION CORN SHELLER – improved in design, construction and performance—a corn sheller that sets new high limits of capacity and money-earning ability for you. It's another Harvey Red Hed.

It works 3 ways to speed shelling at new low cost – The Harvey Red Hed is the only corn sheller with the patented open triple action KERNOLIZER that speeds shelling by doing three things at once.

The KERNOLIZER—the secret of greater capacity—does these three things at the same time: (1) it not only shells corn outside the unit—like ordinary corn shellers—but at the same time (2) it shells corn *inside* the unit, and while it is doing this double job (3) it is pushing cobs and husks toward the discharge. Hand husked or machine picked corn – they look alike to the Red Hed.

A screen pre-cleaner and a controlled air blast cleaner – 4-way feed hopper – adjustable cob outlet – new type corn thrower – corn discharge auger floating on sealed, dust-proof ball bearings are among many other features that contribute to the service, convenience and day-in-and-day-out reliability of this great Harvey Red Hed Corn Sheller.

HARVEY MANUFACTURING CO., RACINE, WISCONSIN

SEE THESE TWO GREAT "RED HEDS" AT YOUR LOCAL HARVEY DEALER

Examine each closely. Then judge for yourself what each offers you in low cost, long life feed grinding and shelling performance. OR – SEND THE COUPON BELOW for the great new book, "Secrets of Successful Feeding," plus complete specifications and description of the Harvey "Red Heds."

• • •

NOW READY – A great new book on feeding – a 50 cent value for only a dime – to help you make feeding of farm grown grains produce more meat, milk and eggs at less cost.

• Practical, information-crammed pages – rations, feeding hints – new profit-producing combinations of feeds – tells why, when and how to feed. Short cuts that every farmer and poultry man needs to know for top feeding results. Compiled by experts.

HARVEY MFG. CO., DEPT. RACINE, WISCONSIN

I want your great new feeding book, "Secrets of Successful Feeding." Enclosed is 10c for my copy.

(Please check) Tell me how the Harvey Red Hed Hammer Mill ☐ Corn Sheller ☐ operate to help me prepare feed faster and more economically. I already own a hammer mill ☐ I already own a corn sheller ☐.

Name .....

Address .....

Town ..... *State* .....

● World-famous horsemen have treated coughs due to colds with SPOHN'S COMPOUND for fifty years. A stimulating expectorant, it acts on mucous membranes of throat and bronchial tubes to make breathing easier and hasten relief. Sold at drug stores and saddlery houses—60c and $1.20.

Free Trial Size Bottle on Request.

SPOHN MEDICAL CO.
Box 14, Goshen, Ind.

Sensational New

Automatic Cattle Oiler and Currier

Will Make You Money!

Thousands of Livestock Raisers are turning to this amazing Automatic Cattle Oiler for labor-saving, effective livestock pest control

FREE—Big illustrated folder tells how you can let your livestock treat themselves for grubs, flies, lice, ticks and other pests when and where they need it with an

Automatic
CATTLE OILER and CURRIER

Easy to install. Lasts a lifetime! . . . Inexpensive . . . All-steel construction . . . For cattle, horses, hogs.

Stop livestock losses due to pests! . . . In one operation the animals curry their coats and apply pest-repelling, medicated dip oil. With the machine ready for use 24-hours each day, animals treat themselves when and where they need it. The machine and the animals do the work, you reap the harvest of faster gains, increased milk production, bigger profits. Get the full details on this amazing livestock profit-builder.

Write "Cattle Oiler" on a post-card, sign your name and address, mail to

Automatic Equipment Mfg. Co.
DEPT. 49-1 — PENDER, NEBRASKA

OR

MAIL COUPON TODAY FOR FREE FOLDER

AUTOMATIC EQUIPMENT MFG. CO.
Pender, Nebraska.
Please send me your descriptive folder on your Automatic Cattle Oiler and Currier and the name of your local dealer.

NAME.....

ADDRESS.....

CITY.....STATE.....

I have.....head of livestock 49-1

KEEP OUT OF COURT

(Continued from page 141)

will be well to keep in mind the exposures here summarized:

Employer's Liability Coverage. Ordinarily a farmer's wife and minor children are not regarded as employees unless they receive a given wage. The "pay" of any employee may include room and board, clothing and incidentals, and farm products he receives as well as money.

Non-ownership Vehicle Coverage. Coverage for vehicles operated by employees who may be acting as the farmer's agent.

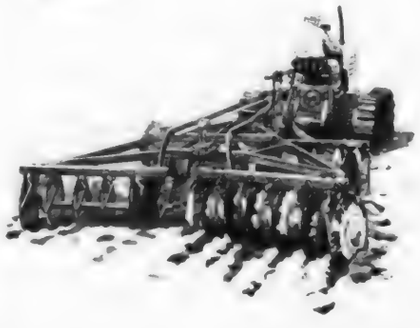
Unlicensed Vehicle Coverage. Coverage for all tractors, wagons, or other farm vehicles (unlicensed) which may be used on or off the farm premises.

Straying Animal Coverage. Property and personal injury coverage for all farm animals including dogs, both on and off the premises.

Farm Products Coverage. Coverage for all agricultural products including livestock as well as milk, vegetables, and other foodstuffs.

Coverage for these as well as other hazards peculiar to any specialized type of farming can be added to your present policies at little, if any, extra increase in the basic rates. Insurance is cheap, far cheaper when measured on the over-all scale of protection and relief from worry, than trusting to the fickleness of luck. I once knew a Minnesota farmer who carried a rabbit's foot in his hip pocket, wore a good-luck charm on his watch chain, and had a shamrock sewed to the brim of his straw hat. One evening he found a horseshoe, spat on it, and tossed it over his shoulder. It must have been an off-day for the rabbit's foot—at any rate the horseshoe sailed through the barn door, bounced off the hired man's head, and broke the lantern by which he had been doing the milking. The barn, uninsured, burned down. The hired man went to a hospital for two weeks, then sued the farmer and collected heavy damages.

The last time the farmer was seen he was still rubbing the rabbit's foot, but backing it up with a full load of insurance . . . in case.



CESSPOOL TROUBLE?

USE

"SURSOLVENT"

Sursolvent is a crystal form of chemical which when supplied to the liquids of any cesspool or septic tank will thoroughly burn out not only the solids in the cesspool but all lodged particles of organic matter in and about the surrounding subsoil. It is these lodged particles of organic matter which make the cesspool watertight causing chronic overflowing. Comes in 100-lb. and 425-lb. barrels. The amount to be used depends upon the soil conditions and age of the cesspool or septic tank. Easy to apply. Simply remove top of cesspool and dump chemicals in. May also be applied through watercloset.

Electric Sewer Cleaning Co.
294 LINCOLN ST. ALLSTON 34, MASS.

Save this ad for future reference. Write for free descriptive literature and prices.

BLIZZARD

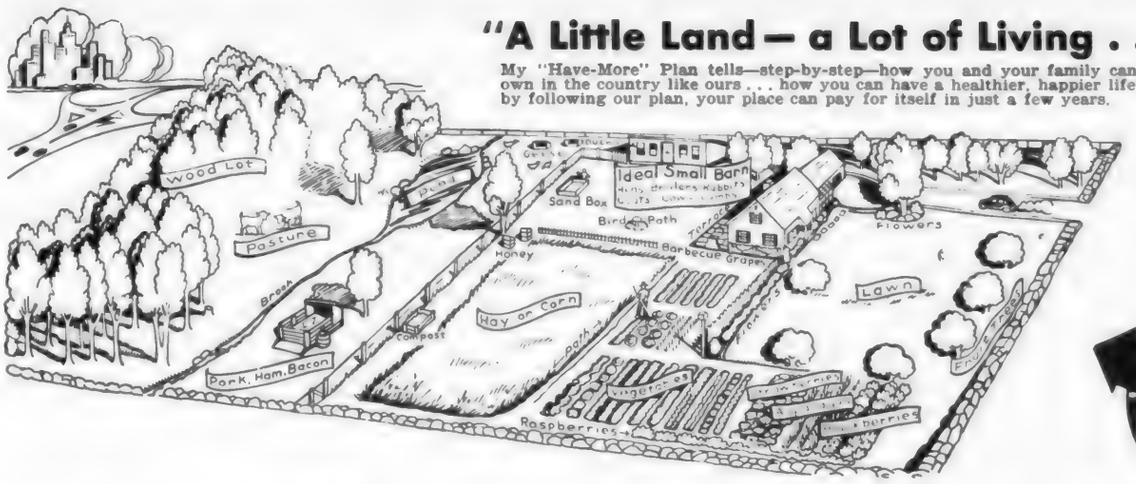
ENSILAGE CUTTER — HAY CHOPPER

LEADS FROM ALL ANGLES

BLIZZARD Has the ONLY All-Angle Pipe Delivery Plus *14 OTHER UNUSUAL FEATURES*

The only machine which permits "streamline" delivery of material at any angle direct from blower fans to silo or haymow.
SAVE valuable TIME and LABOR. Save MONEY.
The Blizzard handles ANY crop—wet, green, dry—elevates anywhere. You need no extras—the Blizzard switches from hay chopping to silo filling, or vice versa, without a nut or bolt being changed! Simple, trouble-free operation.
Write today for Blizzard Grass Silage booklet, Blizzard Catalog, and name of nearest service distributor.

BLIZZARD MFG. CO., CANTON, O. "SINCE 1874"



"A Little Land — a Lot of Living . . ."

My "Have-More" Plan tells—step-by-step—how you and your family can have a little place of your own in the country like ours . . . how you can have a healthier, happier life and more security . . . how, by following our plan, your place can pay for itself in just a few years.

KEEP YOUR CITY JOB — HAVE YOUR HOME IN THE NEARBY COUNTRY!

"This is the way I want to live— *the rest of my life!"*

Here's our garden and six-room house. That's Jackie helping me and that's Carolyn over on the lawn. You can't see our barn because it's the other side of the house, also our garage and tool shed. Our place cost us $600 down. Interest, taxes and amortization payments come to $49.30 a month. This is less than we were paying for rent in the city! In a few hours of spare time a week we produce our own milk and eggs, most of our meat, and more fresh vegetables and fruits than we can use. What we save on our food bills is more than paying for our place!

Our specially-designed small barn. Only 16 ft. by 30 ft. with concrete floor, running water, electricity. It efficiently houses our laying hens, broiler battery, rabbit hutches, goat stanchions or box stall for a family cow, maternity pen for lambs, kids, or calf, even a small pigeon loft! This productive little building actually gives us more food and saves us more money than our big garden.

Mrs. Robinson, Jackie and I aren't selling land nor promoting anybody's products. We just want to tell how we've learned to have more fun, more health, more happiness and more security than 99% of this world's families have ever had!

I guess this sounds boastful, but I don't mean it so. It is just the enthusiasm Mrs. Robinson and I have for the Plan we've worked out. We call it our "Have-More" Plan because that's how it works for us . . . we're having more of just about everything that makes life worth living. Our "Have-More" Plan is the true story of how we Robinsons moved from the city three years ago to our 2-acre place in the nearby country to find a "little land and a lot more living" while I kept a full-time job.

Every Step You Need To Know To Have a Place Like Ours!

Our "Have-More" Plan is a step-by-step account of just how we Robinsons made our move from the city to the country. It is the straight facts all the way through—based on our own experience. It is full of illustrations—lots of actual photographs of our own place. Reading our Plan is just as though you came to see our homestead and we told you all about it.

First, we show you how much less it costs to live this way and how much more living you get for your money. It is actually costing us less to buy our place than we were paying for rent in the city!

We show you just how to go about looking for the right place for your family—just what mistakes to avoid. We give you a handy "Score-Card" of what to watch out for covering locations, roads, distances to work, schools, water supply, kind of soil, house and buildings, neighborhood, whether to rent or buy, zoning restrictions, taxes, price to pay, how the FHA will help you finance your place, etc.

If you are planning to build or remodel, our Plan tells you just how a house should be designed so as to be most suitable for country living—how you'll want the special "Harvest Room" we've designed (which your wife will love) instead of an ordinary kitchen. We tell you about the ideal, low-cost, practical small barn we have.

We show you how important it is to lay out your place correctly—which way to face your house toward the highway and the sun—where to put your outbuildings, your garden, your fruit trees, etc., etc.

How We Raise Most of Our Family's Food in Spare Time

Then we tell you exactly how we raise most of our family's food in a few hours of spare time a week—and have fun doing it. You may or may not have the time or desire to raise as much of your food as we do—but if you do, you can save an awful lot—even enough to pay for your place—besides eating better than you ever did in your life!

We tell you all our shortcuts, ideas, labor-saving methods. About our wonderful quick-freezer which we've had and tested for three years. We call it the "hub" of our homestead because it's the one new invention before all others that makes our "Have-More" Plan practical. Whether or not you raise a lot of your own food, you'll surely want a quick-freezer. What we tell you about ours will help you to get the size and kind you should have at the lowest possible price.

No "Magic" About It

Now, please don't get me wrong. This is no "crack-pot theory" on how to make an easy living! I suppose that if you absolutely had to, you could live a long time entirely off a small place like our two acres. But that would be just existing, not really living. You've got to have some cash income—from a job or a pension or a small business of your own. What I'm saying is that with my "Have-More" Plan you can make a small cash income into the best and happiest kind of a living any family could want. That's WHY we call it our "Have-MORE" Plan.

Will You Join Us?

A friend said, the other day, "Ed, why do you bother with other people? Why don't you settle down and just enjoy your own job and your "Have-More" Homestead? Why try to spread it all over the country?" I may sound silly trying to tell you why. This is my job now. I am putting full time into gathering information on country living . . . for ourselves and others. I feel, somehow, that right now the U. S. needs all the help it can get toward happiness and peace and security.

I've got a boy I want to see grow up in a good country, and if ten or twenty million American families can get set the way the Robinson family is, I don't think anything can hurt this nation very much . . . not even atomic bombs!

Do you see what I mean? That's why I've worked so hard putting this Plan together. That's why I was so careful to be truthful and sensible about everything we put in it. And that's why I've kept the price as low as I possibly could—only $1.00 postpaid.

Now It's Up To You!

So if you are one of our kind of people, if you would like to have the health, happiness and security of a little place in the country like ours, just fill in the coupon here and send it to me. When you get your Plan—by return mail—look it over. If you are disappointed in any way, if you don't agree it's the biggest dollar's worth you ever saw in your life, put it right back in the package and return it to me. I'll send you your dollar back and a dime for your postage.

On the other hand, if you like it, and I'm sure you will, help me by showing it to your friends and getting them to start planning a "Have-More" Homestead also.

Yours for "a little land and a lot of living".

Ed Robinson

P. O. Box 3103, Noroton, Conn.

The quick freezer—our pride and joy—the most practical, most important piece of machinery on our homestead! The freezer makes our whole "Have-More" Plan of home food production practical.

Close-up of a new member of "the family"—a day-old gosling. Jackie takes great interest in all our livestock. He's growing up strong, healthy out here. Our move from the city would have been worthwhile just for his sake.

One of the simplest, most humane ways to kill poultry. A light blow of the hand and the blade, held steady in the slot, punctures spinal cord leaving outlet for blood. Blade springs back, chicken is dropped into barrel.

NOW IS AN EXCELLENT TIME TO GET STARTED

Send to ED. ROBINSON

P. O. Box 3103, Noroton, Conn.

Dear Ed: Here's your dollar. I want to see your "Have-More" Plan. If it's what I want I'll keep it. If not, I'll send it back and you're to return my money—and we'll still be friends.

NAME .....

ADDRESS .....

CITY ..... **STATE** .....

Please make checks $1.05 to cover bank charge.

AS a good buyer you naturally seek quality feeds for your livestock and poultry.

Ask any long-time user of TUXEDO Feeds, and he will tell you that he gets the same good results as always with Tuxedo. He has found that the continuing shortage of the usual sources of proteins has caused no sacrifice of Tuxedo quality to gain excess tonnage. *TODAY*, you can buy from your Tuxedo Feed Dealer with the same confidence as always. He may be a little short of supply at times, but every bag of Tuxedo Feed he sells you is tops in feeding value. See him regarding your requirements.

The Early & Daniel Company
Cincinnati, Ohio
Established in 1881

THE FEEDERS' SILENT PARTNER

TUXEDO FEEDS

FOR PROGRESSIVE FEEDING OF LIVESTOCK AND POULTRY

WATER FOR THIRSTY FARMERS

(Continued from page 128)

In one recent year this agency helped finance the construction of 10,000 ponds. Under this program the farmers can secure payment at the rate of 15 cents per cubic yard of dirt moved. Since contractors charge an average of 10 cents per yard this financial aid resulted in great activity in pond construction.

Minnesota

Because of numerous lakes in the state farm pond construction has been limited to fish propagation projects sponsored by sportsmen groups in cooperation with the Division of Fish and Game. More than 270 of these projects, varying in size from one to 50 acres have been in operation. The Soil Conservation Service has constructed a number of ponds in connection with soil erosion control.

Michigan

Michigan, like Wisconsin, is plentifully supplied with lakes. Farm ponds, however, have been constructed but the engineering problem in this state is complicated by porous soils. A post-war construction program in connection with soil erosion control is planned.

Indiana

The Department of Conservation has made a very special effort to assist the farmers of the state in the construction of ponds and small lakes. The services of engineering and geology departments are supplied free on request. Almost all of Indiana's many state parks have ponds or lakes, several hundred having been constructed in these areas. Water conservation, recreation and wildlife conservation have been stressed. Indiana has one of the most ambitious pond construction programs in the middlewest.

MASON'S GOLDEN MIDGET 56-DAY SWEET CORN

"Sweetest of All"

A real dainty delicacy; ears not over four inches long. Delicious deep kernels. Bears 3 to 5 ears on dwarf waist-high stalk. Extra early. A practical novelty that will delight your family.

2½ Oz. Pkt., $1.00 Postpaid
Enough for five 50 ft. rows

Ask for Catalog of Seeds, Plants & Bulbs

ANDREW R. KENNEDY, Inc.
Dept. 18, 22 W. 27th St., New York 1, N. Y.

KENNEDY SEEDS WALTZ

ONE-MAN SAWMILL LESS THAN $200.00

Easy To Turn Trees Into Money

Makes Lumber fast, shingles, crates, lath, studding, siding.

BELSAW MODELS in 10,14,20,24 ft. sawing lengths. Patented Mechanical Feed, accurate set works and positive dogs. Use tractor or old auto engine for low cost power. Thousands used for commercial sawing. Pays for itself quickly. Send post card today for FREE booklet, "How To Make Lumber" and Catalog of Woodworking Equipment.

BELSAW MACHINERY COMPANY
Dept. 1587 3542 Main Street, Kansas City 2, Mo.

RIVERSIDE New Hampshires

Complete new hatching equipment, streamlined with every last-minute scientific improvement is now in operation. Riverside Chicks, progressively better through more than 21 years of breeding, have always proved profitable—have always given customer satisfaction. Now, you can count on even better chicks.

The astounding demand for Riverside Chicks indicates that we really have something! Yes, more than something! Eggs—yes! Broiler quality—yes! But the livability, the low mortality, the non-broody long range persistent laying—things so important from the profit angle—these also are helping to make Riverside Chicks famous.

We raise 25,000 pullets each year on our four farms. We house 14,000 breeders. Our breeding flock averages over 200 eggs per bird. Many customers report in excess of this.

14,000 BREEDERS ON OUR OWN 4 FARMS
N.H.-U.S. PULLORUM CLEAN AND APPROVED

7 PROFIT FACTORS

1. Fast Growth
2. Quick Feathering
3. Early Maturity
4. Heavy Egg Production
5. Large Egg Size
6. Non-Broodiness
7. Exceptionally High Livability

New Hampshire Baby Chicks—Straight-Run or Sexed Rock—New Hampshire Cross for Broilers

Write today for Catalog giving unique story of our four farms, breeding, prices, etc. Profusely illustrated.

Send for Catalog Today!

RIVERSIDE POULTRY FARMS

LEO BERARD, Owner

SALEM 9, NEW HAMPSHIRE

LETTER TO THE EDITOR

(Continued from page 142)

In the next issue, SUMMER 1946, will be a dozen or more such articles pitched to the practical farmer. For the farm owner who is thinking of going into the dairy business there is an article on CHOOSING A DAIRY BREED. Dr. Salisbury has written a definitive story on ARTIFICIAL INSEMINATION. The story points out the advantages of using this method of breeding and the pitfalls which breeding associations can avoid. The ABC of CONTOUR FARMING AND STRIP CROPPING will be a leading story. The way to convert the old rectangular field to the contour is told in pictures and text. TURKEYS ACROSS THE BOARD will follow somewhat the detailed plan of the article on squabs in this issue. The subject of SILOS AND SILAGE, the types of silage and silos, when to ensile, causes of spoilage, preservatives, and silage tests are given an exhaustive treatment. Our author of THE FINE ART OF MILKING points out that man has been milking cows for more than 4000 years yet few can do a good job. How to get the most milk from a cow should be one of our best summer subjects.

There will be a number of features similar to those which brighten the spring issue. The second of the series on isolated farming groups will describe the AMISH farmers of Pennsylvania and Ohio. The article will be illustrated in a grand manner.

PASTURE IMPROVEMENT

(Continued from page 140)

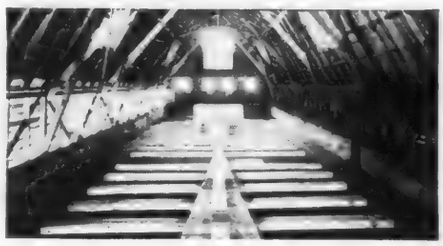
Let The Old Cow Tell The Story—In the fertilizer consuming areas of the east and mid-west there is hardly a farmer who completes his year's work without a small amount of commercial fertilizer left on hand. One of the quickest and most effective ways for a farmer to prove to himself the ability of fertilizer and lime to produce larger amounts of more palatable herbage s to spread these broken bags of old, left-over fertilizer on a strip of poor pasture. When the cattle are turned out in the spring, if the applications are made in the late fall or early spring, the animals will find this treated portion and will graze it exclusively. If you want to prove to a doubting Thomas the value of pasture fertilization, the hard way for him, get him to treat the ten back acres farthest away from the barn. Every night he'll find the cattle grazing there. He'll decide at once to treat the 20 acres nearest to the barn so that he won't have to trudge the entire length of the pasture for them after a hard day's work.

ESPALIER FRUIT TREES

the delight of European gardens, now available in America. Write for FREE CATALOG.

STERN'S NURSERIES, Dept. V, Geneva, N. Y.

How to make 6 times as much grade 1 hay* with air!



1. A MOW-CURING SYSTEM using an American Blower Hay Curing Fan is easy for you to construct. The fan is connected to wooden floor ducts which give even air distribution through the hay, even though the hay is stored 8, 12 or 14 feet deep.

More profit to you from hay! Mow-curing by mechanical ventilation is the answer.

Hay cut at the right stage of maturity, cured in a manner to save protein and carotene and stowed safely in the mow the same day is your assurance of 5 to 6 times the amount of top-quality hay you can possibly produce by field-curing. It's a foolproof way to prevent weather damage, too.

No wonder hundreds of progressive farmers have invested in American Blower Hay Curing Fans*—and found they paid for themselves in a single season!

2. FOUR OR FIVE HOURS of field-drying, then hoist your hay to the safety of the mow. Mechanical ventilation speedily reduces moisture content to the approved 20%. No shattered leaves—no overbleaching—no weather-damage risk. Bright green color is retained.

3. SPREAD YOUR HAY evenly over floor ducts. Labor of handling is no more, and often less, than that required for field-drying. An American Blower Hay Curing Fan does the rest. This simple, inexpensive method has been proving a money-maker to farmers for several years.

U.S. Records prove it produces more!

More and better hay is the proven result of mow-curing by mechanical ventilation with an American Blower Hay Curing Fan. The U. S. Department of Agriculture, in testing samples of both barn- and field-cured hay, found that protein value of barn-cured runs as high as 18% compared with 10 or 11% from field-cured. Their figures prove that you get up to 53% more Grades 1 and 2 with mow-curing than with field-curing. Better hay means better milk—healthier stock.

Get full information on American Blower thoroughly tested, time-proved Hay Curing Fans now! Phone nearest American Blower branch office, or mail coupon for 28-page FREE book today. It contains complete data!

**Successfully used for curing alfalfa, timothy, mixed grasses, soy beans, rye, tobacco, peanuts, etc.*

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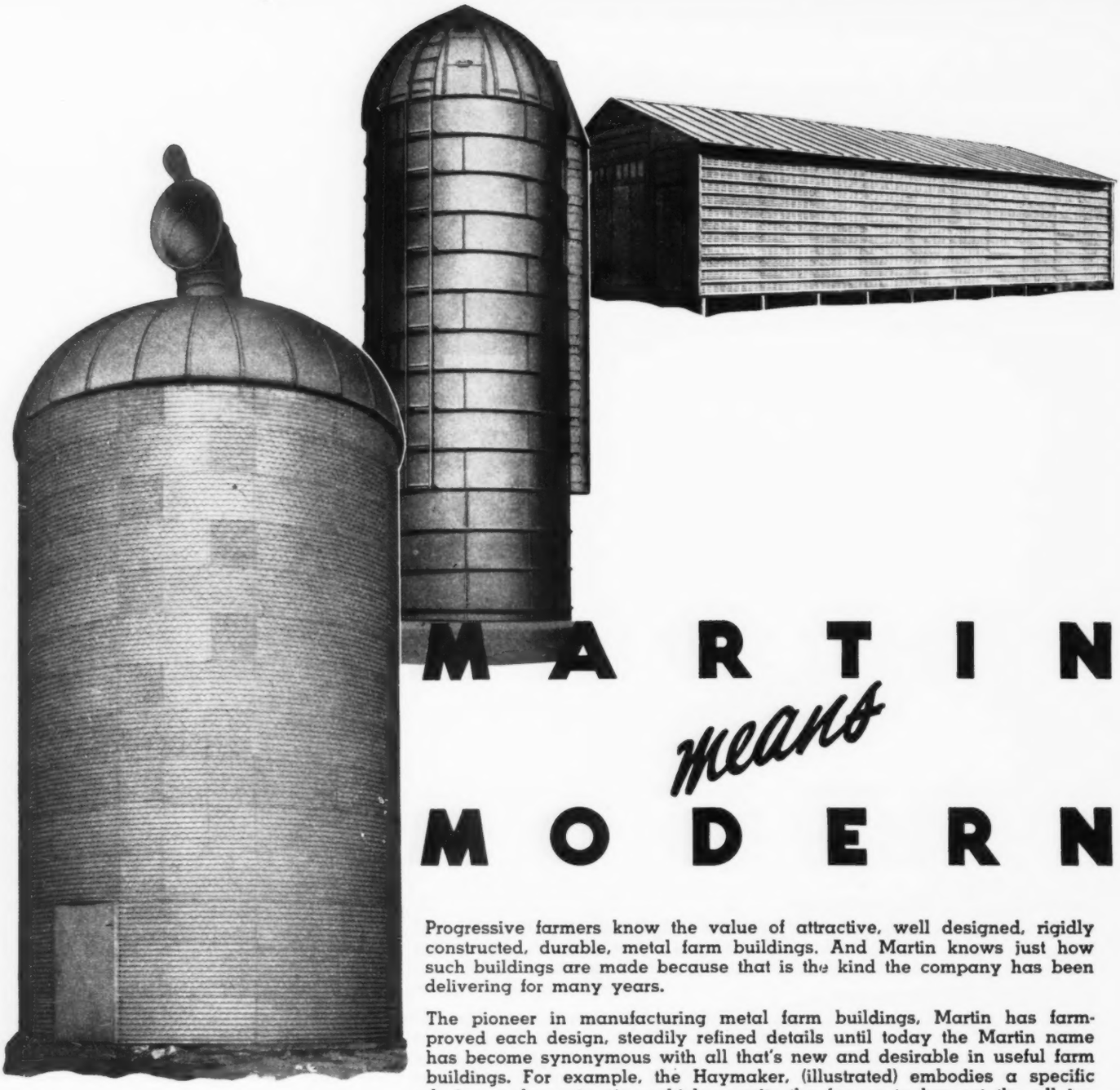

MARTIN *means* MODERN

Progressive farmers know the value of attractive, well designed, rigidly constructed, durable, metal farm buildings. And Martin knows just how such buildings are made because that is the kind the company has been delivering for many years.

The pioneer in manufacturing metal farm buildings, Martin has farm-proved each design, steadily refined details until today the Martin name has become synonymous with all that's new and desirable in useful farm buildings. For example, the Haymaker, (illustrated) embodies a specific design and construction which permits the farmer to harvest the all important hay crop, retaining the maximum in food value with minimum hand labor; through the principle of quick harvesting and forced ventilation to insure safe completion of the mow-curing process.

You, too, will point with pride to your Martin Metal Buildings, as countless farmers are now doing. Their efficiency and long life far exceed the results of individually planned farm buildings. These neat, attractive buildings are a source of continuing satisfaction and become one of the show-places on your farm. The prefabricated sections are easily and quickly erected. Provision is made for readily adding extensions to meet expanding building needs.

A letter of inquiry or the convenient coupon below will bring you additional information about these modern metal farm buildings. Only Martin makes a complete line! Write today!

Martin Steel Products Corp.,
111 Longview Ave.,
Mansfield, Ohio.

Please send me, without obligation, information on the following Martin Metal Farm Buildings:

( ) Haymaker ( ) Corn Cribs
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MARTIN *Better* **FARM BUILDINGS** **METAL**

HAYMAKERS · SILOS · DAIRY BARNS · CORN CRIBS
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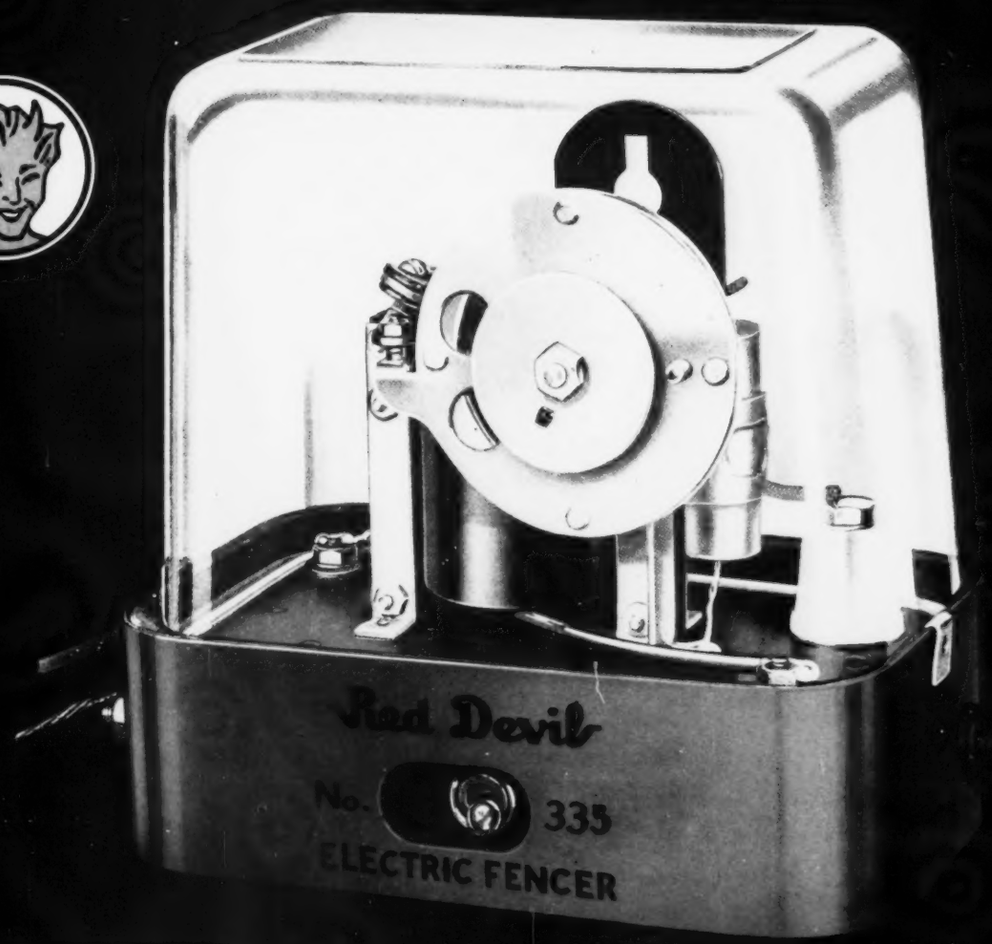


No. 335
$10.95
at your dealer

On-off On-off

Timed like a pulse beat—to increase effectiveness of shock and greatly lengthen battery life.

The No. 335 RED DEVIL ELECTRIC FENCER, with its new "wheel" type contact, uses current only instantaneous—centrifugal force does the rest. The revolving wheel is the only moving part—its rod and bearings are of stainless steel for long wear.* Standard platinum contact points are readily replaceable.

Uses any 6-volt hotshot battery.

Strong, clear glass top permits you to "see it work" at all times.

Sealed to discourage tampering and to bar the elements. No radio interference. Nothing to oil or grease.

The pre-war price discourages imitation—demand the genuine RED DEVIL for guaranteed performance.

Since 1870

Genuine Red Devil Battery Operated ELECTRIC FENCER *at no increase in price*

THE new No. 335 Red Devil combines all the exclusive advantages that made the pre-war model so popular in the confining or rotating of livestock by means of a single wire fence.

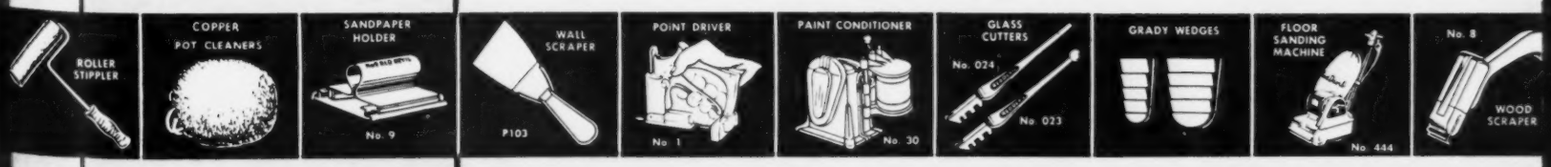
Being battery operated, the No. 335 offers the advantages of absolute safety. The voltage is high, yet the amperage is low and the intermittent stinging shock, although many times more effective, can do no physical or mental harm to livestock or human. The No. 335 is not affected by powerline failure.

The intermittent action explained to the left makes the No. 335 Red Devil a real "juice miser." The working parts are sealed against moisture—rain, hail, sleet, snow or fog cannot interfere with its perfect operation. Only one moving part, nothing to wear out.*

Unconditionally guaranteed against defective parts and workmanship. Comes completely packaged in strong carton (except for 6-volt battery) including battery clamps, fence connectors, screws, template, switch, bracket for hanging, battery wiring, Instruction Sheet and Diagram. . . . $10.95 at your favorite dealer—demand the original and genuine Battery Operated RED DEVIL No. 335 Electric Fencer.

***A product of* Red Devil Tools.**

IRVINGTON 11, NEW JERSEY, U. S. A.



THE POWER OF THE *Family* FARM

Many a wife or daughter has taken over the tractor controls in recent times of emergency. A 12-year-old Maryland girl won the heart of the nation when she "manned" the home farm alone, while her father was overseas.

The power that made it possible is worth a second look. Gone is the tiring armwork of the past, and in its place the comfort, ease and smoothness of *power* control. This farm girl operated an Allis-Chalmers tractor which, like the new Model C pictured here, uses hydraulic control to raise and lower implements at a finger's touch.

Foremost in Allis-Chalmers' planning for the family farm is equipment which can be operated by *one man,* eliminating outside "crew" help. *Power-controlled* implements are a major step in this direction. Equipment like the new Model C Tractor and companion implements with hydraulic control can go far to make the family farm free, independent and prosperous . . . the cornerstone of a busy and prosperous America.

HYDRAULIC LIFT *plus* DUAL DEPTH CONTR

Here's a control that really *controls* — th last word in a hydraulic system. At a touc of your fingers, it lifts and lowers implemen to the exact depth you select. Handy du levers gauge the depth of right and l gangs — independently and accurately. Yo can vary the depth of either gang to follo the contour of the ground as easily as a pil banks his plane.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.